DOCUMENT RESUME

ED 150 280 CE 013 147

TITLE	The E.P.D.A. Instructional System Design Training Project. Final Report.
INSTITUTION	Ohio State Univ., Columbus. Trade and Industrial Education Instructional Materials Lab.
SPONS AGENCY	Ohio State Dept. of Education, Columbus. Div. of Vocational Education.
PUB DATE	75
GRANT	OEG-5-74-0144
NOTE	382p.
EDRS PRICE	MF-$0.83 HC-$20.75 Plus Postage.
DESCRIPTORS	Behavioral Objectives; Curriculum Guides; Educational Research; Educational Resources; Faculty Development; *Inservice Programs; Inservice Teacher Education; Institutes (Training Programs); Instructional Materials; *Instructional Systems; Job Analysis; Job Skills; Learning Activities; *Learning Modules; Models; Performance Based Education; *Program Development; Program Guides; Resource Materials; Skill Analysis; Systems Approach; Systems Development; *Task Analysis; *Vocational Education; Vocational Education Teachers; Workshops

ABSTRACT

A vocational education project was undertaken to (1) design and develop a training package to train teachers and curriculum personnel in the development of instructional systems based on task lists and performance, (2) organize and conduct an institute for training teachers and curriculum personnel in the development of instructional systems based on performance and using data gathered from occupational analysis, and (3) have a pool of trained professionals for instructional development at both state and local levels. The project results are as follows: (1) A working instructional system design (ISD) model and the accompanying strategies were developed that enabled vocational personnel to apply the systems approach to designing and developing instructional programs, (2) all project activities culminated in a one-week institute (workshop) where vocational teachers, directors, supervisors, and teacher educators were trained in the system concepts and applied strategies, and (3) thirty-four vocational personnel were introduced to the ISD concepts and applied strategies. Most of this book consists of the institute training package and includes the workshop goals, schedules of activities, a bibliography, the ISD model, and workshop modules. These modules concern systems and the systems approach to instructional design, task survey, occupational analysis and performance objectives. The presentation of six sample course outlines and course of studies developed by the workshop participants concludes this document. (EM)

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ED150280

FINAL REPORT
ON
THE E.P.D.A. INSTRUCTIONAL SYSTEM DESIGN TRAINING PROJECT

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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TO

THE OHIO DEPARTMENT OF EDUCATION
THE DIVISION OF VOCATIONAL EDUCATION

CONDUCTED BY

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CE 013 147

INSTRUCTIONAL SYSTEM DESIGN

Grant Number 0EG-5-74-0144

Subproject 74082

Dates July 1, 1974 to August 31, 1975

FINAL REPORT

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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CE 013 147

TRADE AND INDUSTRIAL EDUCATION
INSTRUCTIONAL MATERIALS LABORATORY
OHIO DEPARTMENT OF EDUCATION
VOCATIONAL EDUCATION DIVISON

Title of Project:

Instructional System Design

Institution:

Instructional Materials Laboratory
Trade and Industrial Education
The Ohio State University
1885 Neil Avenue
Columbus, Ohio 43210

Date Completed:

August 31, 1975

Justification:

This project carried the process of instructional system design from developed occupational analysis into instructional content. The great advances in education during the past ten years have caused instruction to move from an art toward a technology. In the past, instruction materials and curricular content were developed out of the subjective decision-making of each instructor. Today, the instructor must use systematically derived basis on which to make decisions about what a course should contain in the way of content, specificity of treatment, procedures, and evaluation.

Too few instructors, supervisors, and directors have had any training in applying a system in developing curriculum and instruction. If vocational education is to continue to find its strength in the areas of providing "Action Education" experiences involved with performance, teachers, supervisors, and directors must learn to apply the technology.

Objectives:

1. Design and develop a training package to train teachers and curriculum personnel in the development of instructional systems based on task lists and performance.

2. Organize and conduct an institute for training teachers and curriculum personnel in the development of instructional systems based on performance and using data gathered from occupational analysis.

3. To have a pool of trained professionals for much needed instructional development at both the state and local level.

PROJECT RESULTS

The project resulted in the development and utilization of a set of strategies and a working model, that were used to train various personnel in Instructional Systems Design. The strategies and model were proven effective across all services and were learned and applied by vocational personnel in designing sample course outlines and courses of study. The vocational personnel's efforts resulted in six samples of course outlines and courses of study that have been presented to all vocational superintendents, directors, local supervisors and state staff. This specific project and its accompanying one week workshop succeeded in conveying the concepts of using an applied system in the development of curriculum and instruction.

Specifically, the results of the project are listed as they were achieved in relation to each specific objective.

1. A working model and the accompanying strategies were developed, that enabled vocational personnel to apply the systems approach to designing and developing instructional programs.

2. All project activities culminated in a one week institute where vocational teachers, directors, supervisors, and teacher educators were trained in the system concepts and applied strategies. Project evidence of this effort is displayed in the six sample course outlines and sample course of study which were developed.

3. Thirty-four vocational personnel were introduced to the Instructional Systems Design concepts and applied strategies.

Each of the objectives and results obtained were analyzed in an effort to evaluate the success of the project. Efforts were made to evaluate the reception of the ISD concepts as well as the strategies used in the training institute. In an attempt to provide insights into the success of the project in terms of training effectiveness several kinds of subjective assessments are presented. The measures for the most part, consist of responses collected from the institute participants at the close of the institute.

Workshop Evaluation Scale

A workshop evaluation scale was administered to twenty-three workshop participants who were present at the last session of the workshop. This group consisted of ten supervisors, five instructors, three directors, two teacher educators, one vocational counselor, one consultant, and one state staff person. The scale was administered to assess the attitudes of the participants towards the arrangements purposes, and program of the workshop. The Workshop Evaluation Scale was adapted from a scale designed by McKinney and Mannebach.*

Each statement in the evaluation scale was scored on the degree to which the participants agreed with the statements indicating favorable response to the workshop and disagreed with the statements indicating an unfavorable attitude toward the workshop. The favorable statements with responses of strongly agree, agree, undecided, disagree, and strongly disagree were given values of five, four, three, two, and one respectively. The values assigned were reversed for the unfavorable statements. The data is summarized in the table. The numbers of responses to each category on each item and the mean response for each item on the scale are reported.

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*McKinney, Floyd L. and Mannebach, Alfred J., Proceedings and Follow-up of a Workshop on Determining Performance Objectives. Kentucky Research Coordinating Unit for Vocational Education, University of Kentucky, November 1971.

As evidenced by the data in the table, the reaction of the participants to the workshop was mixed. The mean scores ranged from 2.85 to 4.68. The participants rated the items dealing with the workshop environment, teaching-learning strategies, performance objectives, and information presented. The statements receiving low scores were those dealing with goals of the workshop in relation to the goals and expectations of the participants. The statements receiving the least agreement were 1, 2, 3, 5, and 24. These statements indicated that approximately half of the participants felt that the objectives of the workshop were not the same as theirs, the program did not meet their expectations, and there were not specific, clear or realistic goals to make the production work efficient.

TABLE

NUMBER AND MEAN RESPONSES ON THE WORKSHOP EVALUATION SCALE ADMINISTERED TO TWENTY-THREE PARTICIPANTS COMPLETING THE INSTRUCTIONAL SYSTEMS DESIGN WORKSHOP

Statement	Number of Responses					Mean
	SA	A	U	D	SD	X
1. The goals of this workshop were clear to me	1	13	0	6	2	3.22
2. The objectives of this workshop were not realistic	2	2	7	12	0	3.26
3. Specific goals made it easy to work efficiently	3	7	3	8	2	3.04
4. The participants accepted the purposes of this workshop . . .	4	12	3	3	1	3.65
5. The objectives of this workshop were not the same as my objectives	4	6	3	10	0	2.85
6. I didn't learn anything new. . .	1	1	0	10	11	4.26
7. The material presented was valuable to me.	6	15	2	0	0	4.17
8. I could have learned as much by reading a book	0	0	1	14	8	4.30
9. Possible solutions to my problems were considered	1	13	4	4	0	3.50
10. The information presented was too elementary	0	0	0	17	6	4.26
11. The consultants really knew their subjects	5	13	2	0	0	3.95
12. The group leaders were well prepared	5	11	3	2	0	4.00

TABLE (CONTINUED)

Statement	Number of Responses					Mean
	SA	A	U	D	SD	X
13. I was stimulated to think objectively about the topics presented	5	15	1	2	0	4.09
14. New acquaintances were made which will help in my future work	9	14	0	0	0	4.39
15. We worked together as a group	11	10	2	0	0	4.45
16. We did not relate theory to practice	0	2	2	16	3	3.74
17. The sessions followed a logical pattern	1	12	5	2	3	3.26
18. The schedule was too fixed . .	0	1	0	20	2	4.00
19. The group discussions were excellent	5	14	2	1	1	3.91
20. There was very little time for informal conversation	0	0	0	16	7	4.30
21. I did not have an opportunity to express my ideas	0	0	0	15	8	4.35
22. I really felt a part of this group	8	13	2	0	0	4.26
23. My time was spent well	3	12	5	1	2	3.56
24. The program met my expectations	0	11	5	4	1	3.09
25. I have no guide for future action	0	2	0	15	6	4.09
26. Too much time was devoted to trivial matters	0	3	0	20	0	3.74
27. The information presented was too advanced	1	0	0	17	5	4.09

TABLE (CONTINUED)

Statement	Number of Responses					Mean
	SA	A	U	D	SD	X
28. The content presented was not applicable to occupational programs	1	1	0	17	4	3.96
29. Workshops of this nature should be offered again in future years	4	14	4	0	1	3.87
30. Workshops such as this will contribute little to my job . .	0	0	1	16	6	4.22
31. The strategies presented were useful to me in my job	5	15	1	0	0	4.00
32. The reference available to participants were not appropriate	0	1	5	17	0	3.70
33. The administrators in my school encourage innovations in classroom teaching methods	8	11	1	2	0	4.45
34. I believe attempts should be made to base instruction on performance objectives	13	8	1	1	0	4.43
35. I find that instruction using performance objectives is valuable in helping the student succeed .	12	10	0	0	0	4.54
36. An instructional system that encourages the student to assume greater responsibility for his/her learning is desirable for Vocational Educaiton	14	9	0	0	0	4.61
37. I advocate that individual student needs are not the basis of good vocational instruction	0	0	1	5	16	4.68
38. The implementation performance objectives in the classroom is so time-consuming that their use is not feasible	0	1	2	14	5	4.04

TABLE (CONTINUED)

Statement	Number of Responses SA	A	U	D	SD	Mean X
39. I will have problems convincing the administrator in my school of the worth of the I.S.D. approach	0	3	7	11	1	3.45
40. I feel that I have access to sufficient outside assistance and advice to implement the I.S.D. approach in my school . . .	1	9	9	2	1	3.32
41. I think that instruction using performance objectives is valuable in helping the student succeed on the job	10	13	0	0	0	4.43
42. I teach every student the same way because it has worked well for years	0	1	2	6	13	4.41
43. I believe it is more important to work with the entire class than to spend a lot of time with individuals	0	1	3	11	8	4.13
44. I feel that instruction using performance objectives is asking too much of the instructors . .	0	0	3	15	5	4.09
45. The pre-test/post-test format of the I.S.D. approach is not adequate for evaluation of student learning	0	2	4	15	2	3.74
46. I feel that criterion referenced testing (testing against an objective) is more fair to students than norm referenced testing (testing against a class average)	8	14	1	0	0	4.30
47. I agree that all students don't learn at the same rate and should be taught accordingly	15	8	0	0	0	4.65

PROJECT PLANS AND STRATEGIES

The project lead time was utilized in the very beginning to conduct a review of the state of the art in instructional design techniques and concepts. The various strategies were developed, and personnel were identified to conduct the actual institute. The initial approaches, procedures and strategies were further refined in a series of preplanning sessions involving: instructional technology personnel, vocational teachers, vocational teacher education personnel, state and local administrators and business and industrial representatives. These preplanning sessions provided an opportunity for direct input from the various groups and established priorities on needs which could be met within the scope of the project. Specifically the preplanning sessions resulted in:

1. Identifying the specific instructional techniques that would be most beneficial to vocational teachers and curriculum personnel.

2. Determining the level of specificity and competence that would be a realistic expectation as a result of the actual institute.

3. Identify the available resources and what specific procedures should be followed in order to utilize available expertise and resources.

4. Establishing a time frame and specific objectives for the project within the limitations of time, money, and personnel.

As a result of the examination of the "State of the art" in instruction systems design, the project director and supervisor developed a model that when applied seemed to achieve the desired results.(Appendix I).While this model was developed early, it was and still is, subject to revision as the needs change.

Once this model was developed and accepted by the various members of the state staff and planning committee the project staff began to gather materials and actually progress through the model. The materials gathered and produced were used as examples and training aids in the actual ISD training institute.

After the gathering of information and materials the project staff developed and set fourth the goals and objectives of the institute/workshop.

Workshop Coals:

1. To present contemporary strategies and techniques for planning and developing vocational curriculum.

2. To develop valid samples of the several componets of a course of study based upon an occupational analysis.

Workshop Objectives:

Following active participation in the institute/workshop the participants will be able to:

1. Plan and conduct a task survey to collect information about occupations in their geographic area of interest.

2. Use any of the available occupational analysis to develop or assist in the development of vocational curriculum.

3. Plan and assist in the development of a course of study using the suggested format for your service, with local adaptations.

4. Plan and develop lessons and module for vocational instruction based on performance objectives and criterion referenced test measures.

Once these goals and objectives became accepted by the planning committee and the project staff the actual activities for their attainment were designed and developed.

Workshop Activities:

1. Individual readings and exercises using the prepared instructional modules and available texts.

2. Small group instructions and work sessions led by selected individuals who provide guidance on using the suggested formats.

3. Large group presentations and discussions to provide orientation and conduct reviews of individual and small group progress.

4. "Cracker barrel" discussions sessions with key resource people to explore in depth the strategies presented.

Institute/Workshop Participants

The planning committee determined that the best way to insure usable and representative samples of curriculum was to concentrate on several occupational areas. While all institute/workshop participants would initially be responsible to the completed ISD process, they eventually broke into groups to develop sample curriculum based upon the common ISD strategies. For this reason, the following six occupations were studied by service area.

Agriculture – Horticulture
Business and Office – Data Accounting
Distributive Education – Auto Sales
Health – Medical Assisting
Home Economic – Baking
Trade and Industrial – Auto Mechanic

After securing answers to the following questions, the participants were selected.

1. What are your job responsibilities?
2. How are you involved in developing curriculum or designing instruction activities?
3. What are you personal reasons for attending this workshop?
4. How will Instructional System Design techniques be used in your school system and how will you be involved? (answer in conjunction with your supervisor).

The following participants were selected to attend the Instructional Systems Design Institute/Workshop:

Agriculture – Horticulture

Robert D. Fuller, Ag. Supervisor
Delaware Co. J.V.S.

John E. Cheetwood, Instructor
Vanguard J.V.S.

Howard L. Neal, Ag. Supervisor
Green Voc. School

David C. Barrett, Voc. Director
Washington Co. J.V.S.

Wilber R. Weir, Voc. Director
Medina Co. J.V.S.

Harlan Ridenour, Ag. Curriculum Mat. Lab
O.S.U.

Business and Office Education

Kathy Jones, Instructor
Lima Senior H.S.

Larry L. Albanese, Instructor
Belmont Co. J.V.S.

Business and Office Education (cont.)

Thomas Horwedel, B.O.E. Supervisor
Medina Co. J.V.S.

Daniel J. Vicarel, Supervisor B.O.E.
State Staff

Distributive Education

Robert Bohac, D.E. Coordinator
Ashland Co. J.V.S.

Roger K. Daugherty, Adult Director
Mansfield City Schools

Neal E. Vivian, Teacher Educator
O.S.U.

Kathy Ashmore, D.E. Curriculum Mat. Lab
O.S.U.

Home Economics

Eugene Wamsley, Instructor
Scarlet Oaks J.V.S.

Peggy Jobe, Home Ec. Supervisor
Medina Co. J.V.S.

Barbara Murphy, Home Ec. Coordinator
Akron Public Schools

Jane Link, Home Ec. Supervisor
D. Russell Lee Voc. School

John Dempsey, Instructor
Cleveland Public Schools

Laura Purnice, Home Ec. supervisor
State Staff

Home Economics (cont.)

Mary Andrian, Assistant Professor
O.S.U.

Penelope A. Reighart, Instructor
O.S.U.

Health Occupations

Alice Price, Supervisor
Montgomery Co. J.V.S.

Ross Graves, Voc. Director
Vantage J.V.S.

Joan W. Ray, Instructor
Columbus Public Schools

Judith R. Lowe, Medical Assistant
Columbus, Ohio

David R. Hufford, Supervisor
Apollo J.V.S.

Jane Huffstutler, Voc. Counselor
Penta Co. J.V.S.

Trade and Industrial Education

John A. Oguich, Voc. Director
Jefferson Co. J.V.S.

Robert Harder, Instructor
Washington H.S.

James Pegg, T/I Supervisor
Green Voc. School

Gerald A. Bryant, T/I Supervisor
Penta Co. J.V.S.

Trade and Industrial Education (cont.)

John T. Vasko, Teacher Educator
Kent State University

Burchard Sheehy, T/I Supervisor
Medina Co. J.V.S.

INSTITUTE/WORKSHOP

The Instruction Systems Design Institute/Workshop was conducted from Monday June 16, 1975 through Friday June 20, 1975. The following material was presented to the participants:

I. Institute/Workshop Goals and Objectives.
II. Schedule of activities
III. Bibliography
IV. Model .
V. Systems Concept
VI. Task Survey
VII. Occupational Analysis
VIII. Performance Objectives
IX. Criterion Test Measures

I. Institute/Workshop Goals and Objectives

INSTRUCTIONAL SYSTEMS DESIGN WORKSHOP

This workshop is being conducted as part of an E.P.D.A. funded project to develop strategies and materials, and provide training experiences for vocational personnel involved in curriculum development. The participants represent all areas of vocational educators involving teachers, teacher educators, local directors and supervisor, and state supervisors and assistant directors in a unified effort to develop samples of a course of study for each vocational service. The products and outputs of this workshop will be used as guideline materials and strategies for future development and revision of vocational programs during the coming year.

WORKSHOP GOALS

1. To present contemporary strategies and techniques for planning and developing vocational curriculum.
2. To develop valid samples of the several components of a course of study based on an occupational analysis.

WORKSHOP OBJECTIVES

Following active participation in this workshop the participants will be able to:

1. Plan and conduct a task survey to collect information about occupations in their geographic area of interest.
2. Use any of the available occupational analyses to develop or assist in the development of vocational curriculum.
3. Plan and assist in the development of a course of study using the suggested format for your service with local adaptations.
4. Plan and develop lessons and modules for vocational instruction based on performance objectives and criterion referenced test measures.

WORKSHOP ACTIVITIES

1. Individual readings and exercises using prepared instructional modules and available texts.
2. Small group instructions and work sessions led by selected individuals who will provide guidance on using the suggested format for a course study.
3. Large group presentations and discussions to provide orientation and conduct reviews of individual and small group progress.

✓

4. "Cracker barrel" discussion sessions with key resource people to explore in depth the strategies presented.

5. A position paper to be prepared by each participant expressing his/her synthesis of the ideas, experiences, and exercises presented during the workshop with special emphasis on your opinions of strategies and their use in vocational curriculum development at the local level.

II. Schedule of activities

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8:00	Registration and coffee "Buckeye Room" 11th floor	Strategy for developing a course of study (group work)	Planning blocks of instruction	Continue course of study development	Developing an instruction module or lesson
9:00	Welcome Workshop objectives	Outline development			
10:00	A curriculum model	Scope of course	Task detailing	Finalize course of study development	
11:00	"A System Approach"	Sequence of course			
12:00					
1:00	Task survey technique	Developing instructional strategies	Task detailing	Developing Performance Objectives	Course of study Review and evaluation
2:00					Workshop evaluation and final business
					Close
3:00	Occupational Analysis	Planning blocks of instruction		Developing criterion test	
4:00	Review and discussion	Cracker Barrel	Cracker Barrel	Cracker Barrel	
5:00		Topic to be announced	"Task Survey"	Performance Objectives	

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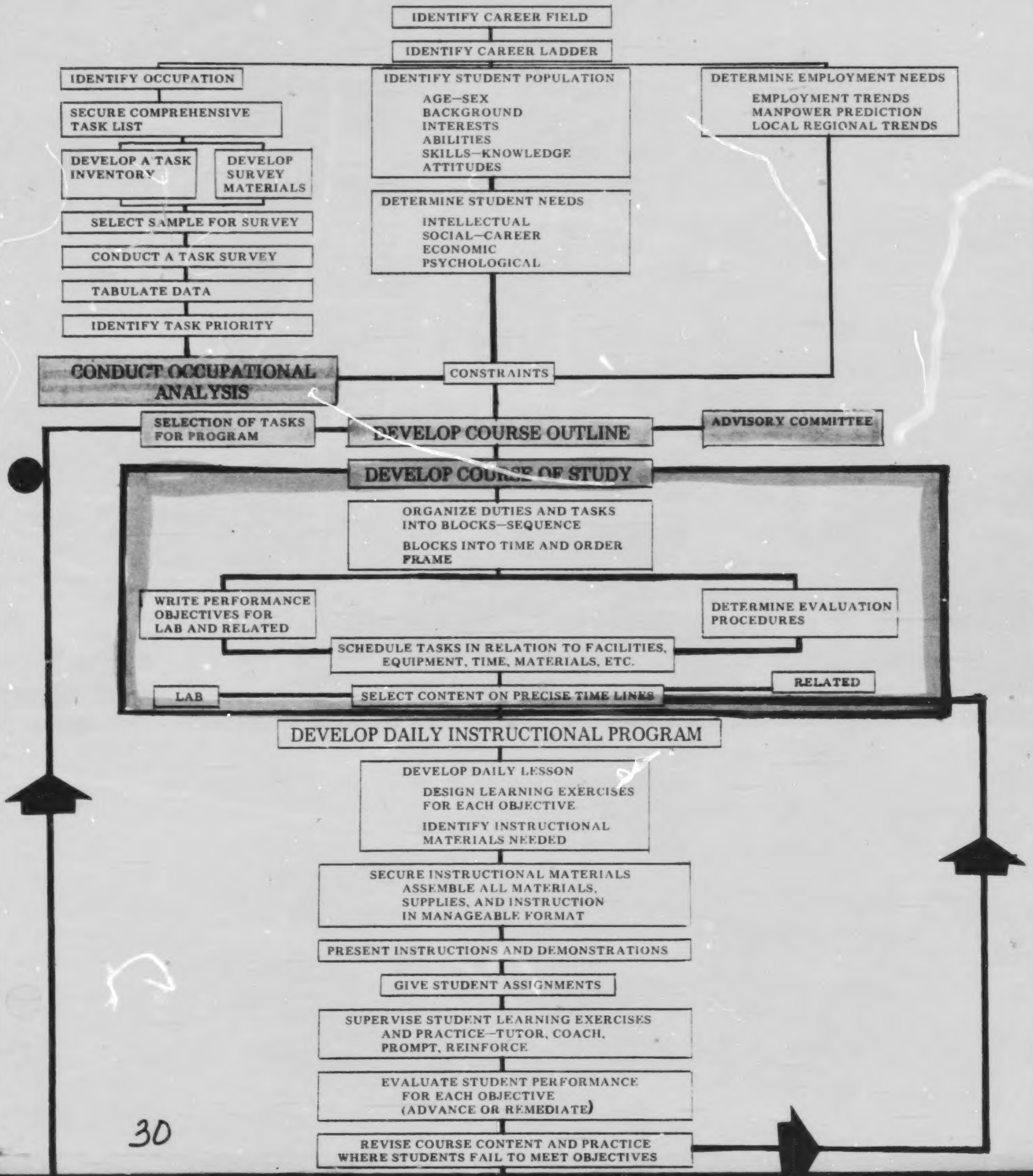
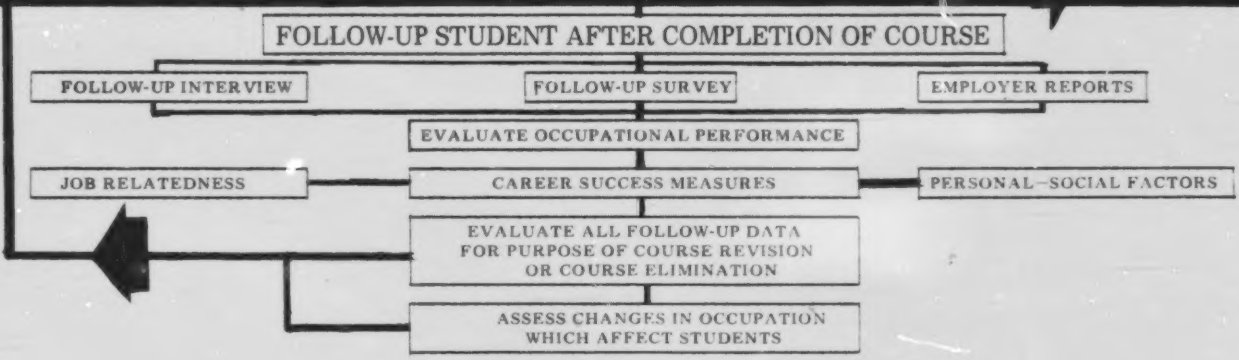
IV. Model

I.S.D. MODEL


IDENTIFY CAREER FIELD
IDENTIFY CAREER LADDER
IDENTIFY OCCUPATION
SECURE COMPREHENSIVE TASK LIST
DEVELOP A TASK INVENTORY
DEVELOP SURVEY MATERIALS
SELECT SAMPLE FOR SURVEY
CONDUCT A TASK SURVEY
TABULATE DATA
IDENTIFY TASK PRIORITY
IDENTIFY STUDENT POPULATION
AGE—SEX
BACKGROUND
INTERESTS
ABILITIES
SKILLS—KNOWLEDGE
ATTITUDES
DETERMINE STUDENT NEEDS
INTELLECTUAL
SOCIAL—CAREER
ECONOMIC
PSYCHOLOGICAL
DETERMINE EMPLOYMENT NEEDS
EMPLOYMENT TRENDS
MANPOWER PREDICTION
LOCAL REGIONAL TRENDS
CONDUCT OCCUPATIONAL ANALYSIS
CONSTRAINTS
SELECTION OF TASKS FOR PROGRAM
DEVELOP COURSE OUTLINE
ADVISORY COMMITTEE
DEVELOP COURSE OF STUDY
ORGANIZE DUTIES AND TASKS INTO BLOCKS—SEQUENCE
BLOCKS INTO TIME AND ORDER FRAME
WRITE PERFORMANCE OBJECTIVES FOR LAB AND RELATED
DETERMINE EVALUATION PROCEDURES
SCHEDULE TASKS IN RELATION TO FACILITIES, EQUIPMENT, TIME, MATERIALS, ETC.
LAB
SELECT CONTENT ON PRECISE TIME LINES
RELATED
DEVELOP DAILY INSTRUCTIONAL PROGRAM
DEVELOP DAILY LESSON
DESIGN LEARNING EXERCISES FOR EACH OBJECTIVE
IDENTIFY INSTRUCTIONAL MATERIALS NEEDED
SECURE INSTRUCTIONAL MATERIALS
ASSEMBLE ALL MATERIALS, SUPPLIES, AND INSTRUCTION IN MANAGEABLE FORMAT
PRESENT INSTRUCTIONS AND DEMONSTRATIONS
GIVE STUDENT ASSIGNMENTS
SUPERVISE STUDENT LEARNING EXERCISES AND PRACTICE—TUTOR, COACH, PROMPT, REINFORCE
EVALUATE STUDENT PERFORMANCE FOR EACH OBJECTIVE (ADVANCE OR REMEDIATE)
REVISE COURSE CONTENT AND PRACTICE WHERE STUDENTS FAIL TO MEET OBJECTIVES


FOLLOW-UP STUDENT AFTER COMPLETION OF COURSE
FOLLOW-UP INTERVIEW
FOLLOW-UP SURVEY
EMPLOYER REPORTS
EVALUATE OCCUPATIONAL PERFORMANCE
JOB RELATEDNESS
CAREER SUCCESS MEASURES
PERSONAL–SOCIAL FACTORS
EVALUATE ALL FOLLOW-UP DATA FOR PURPOSE OF COURSE REVISION OR COURSE ELIMINATION
ASSESS CHANGES IN OCCUPATION WHICH AFFECT STUDENTS

IML

V. Systems Concept

ISD WORKSHOP

"SYSTEMS"

SYSTEMS AND THE SYSTEMS APPROACH TO INSTRUCTIONAL DESIGN . . .

This module will explore systems, and how they relate to the design of instructional programs. The application of the systems approach to the planning and development of an instructional program involves more than the use of current innovations in media and teaching techniques. Under the concept of the systems approach, existing education and training programs can be revitalized and new programs developed which insure that students acquire the performance abilities needed.

MODULE OBJECTIVES

After completing this module you will:

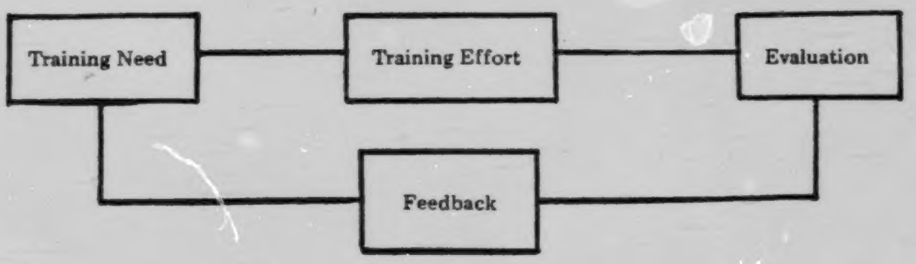
1. Define the common terminology as it relates to the systems approach to instructional design.
2. Identify the basic steps involved in the systems approach.
3. List, for each basic step of the process, how your school could utilize the systems approach.
4. List local barriers or constraints which must be considered when designing instructional programs.
5. Design a workable system that could be implemented in your school or subject area.
6. Illustrate your designed system with a model.

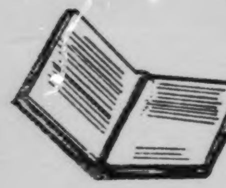
The title of this workshop Instructional Systems Design (I.S.D.) contains the word "systems." Instructional design is built around the word "systems," and it must be thought of as a concept. Because we are working with a concept, a simple definition of "systems" would not be adequate. In the process of working your way through this module it is hoped that you will begin to see real applications involving the systems concept. In an effort to help you understand systems as a concept we will present many definition of the word.

"Systems concept describes the complete interaction of the individual elements of the system."

"A system is any group of parts or components working together as a functional unit."

The word " systems" will logically be related to a similar word "systematic." But being systematic is not the same thing as applying a systems approach. One can be most systematic and still not understand the concept of the systems approach. The systems approach is a way of proceeding from identified needs to predictable outcomes. It is a closed loop, self correcting process. The best way to illustrate this concept is by a model.





"A model is a representation of reality."

This model represents the systems concept, in its most basic elementary stage. It has four basic parts:

1. Identifying the needs
2. Strategy for satisfying the needs
3. Evaluating the success of the effort
4. Revising and modifying to more fully satisfy the needs.

You can see that this basic systems model starts with needs. This is a concept which you will find in all systems approach strategies. This concept will either be implied or explicitly stated. The word "need" is defined as a discrepancy between what something *is* and what it *should* be. This model is a closed loop, self correcting system, because each part provides inputs for the next, and development within this model is never completed until each need has adequately been satisfied.

In the space provided, define the listed terms, and abbreviations.

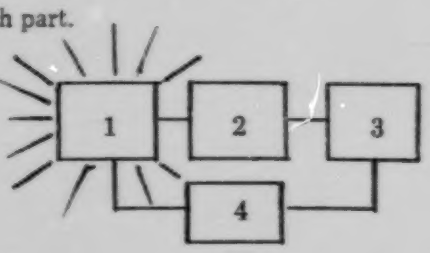
1. I.S.D.:

2. NEEDS:

3. CLOSED LOOP SYSTEM:

Beginning with this basic four-part model we can explore each of the four parts in detail and determine the precise steps which are involved in each part.

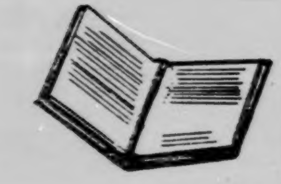
PART#(1)-Training need



Systems are established in response to a need that exists in their environment. We have already determined that a need is a discrepancy between what something *is* and what it *should be*. We also know that the basic model starts with needs and that in a closed loop self correcting system, each part provides the inputs for the next part. What this means is that every future part, relates to the succeeding part. It all starts with the needs.

In the systems approach, every effort is made to identify and document these needs that exist. This should provide a valid starting point for education.

Once the needs are selected an analysis of them will lead to the identification of the objectives of the system. The objectives are the nucleus around which a system grows. The system is built and exists for the purpose of achieving the objectives.



"The more precise an analysis we make of needs, the more accurately we can define requirements and the more specifically we can state the goals of the system."

"The more specifically stated the goals, the more precisely measurable is its attainment."

"The higher the degree of accuracy in measuring the probability of attaining the goal, the more likely it is that the need will be satisfied."

At this point we want to direct our thinking to *Part One (1)* as it relates to designing programs of instruction in Vocational Education.

We can start our systems thinking by identifying a basic curriculum need in our school. We can identify the need for Vocational Programs. At this point we may not know which programs to offer, so we must document the need for any specific program.

We will start with the suspected need for a *Medical Assistant Vocational program.*

The next step is to document this need. Would it be feasible to operate a medical assisting program?

From this expressed need we have formulated a problem to solve.

"The system's approach is not a method or a technique; or is it a fixed set of techniques; but rather a concept, or a way of looking at a problem."

Need: New Vocational Program — Medical Assisting

Problem: Would it be feasible to operate a Medical Assistant Program?

How can we solve this problem?

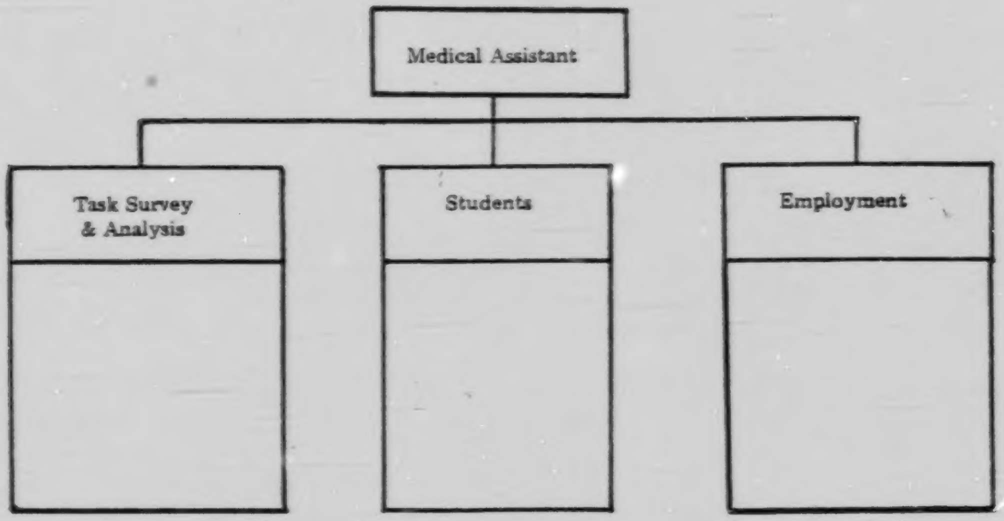
"Systems make possible the solution of a series of problems involved in the assembly of a large number of diverse elements into a ordered whole."

We must gather data and document our findings. This data will come from these (3) primary sources:

I EMPLOYMENT

II STUDENTS

III TASK SURVEY & ANALYSIS


Medical Assistant
Task Survey & Analysis
Students
Employment

I Employment

- A. Employment trends
- B. Manpower predictions
- C. Local and regional needs

When answering the question "Would it be feasible to operate a medical assisting program?" we must consider the employment opportunities for the potential graduates. We must document what the job offers the graduates. Are there jobs now and will there be jobs in the future?

II Students

A. Identify student population

1. age — sex
2. background
3. interests
4. abilities
5. skill — knowledges
6. attitudes

B. Identify student needs

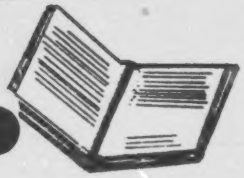
1. intellectual
2. social — career
3. economic
4. psychological

In order to answer questions concerning the students you will have to identify the potential students for the planned program. Since the planned program is possibly a few years away you may wish to identify the students that are younger now, but will be the potential students when you start up the program. A basic question to answer is: "are they interested in the Medical Assisting Career field? Will they have the necessary prerequisite skills and knowledge?" The expected wages of a graduate should be known. The advancement opportunities, future training opportunities and total job image must be considered.

III Task Survey and Analysis

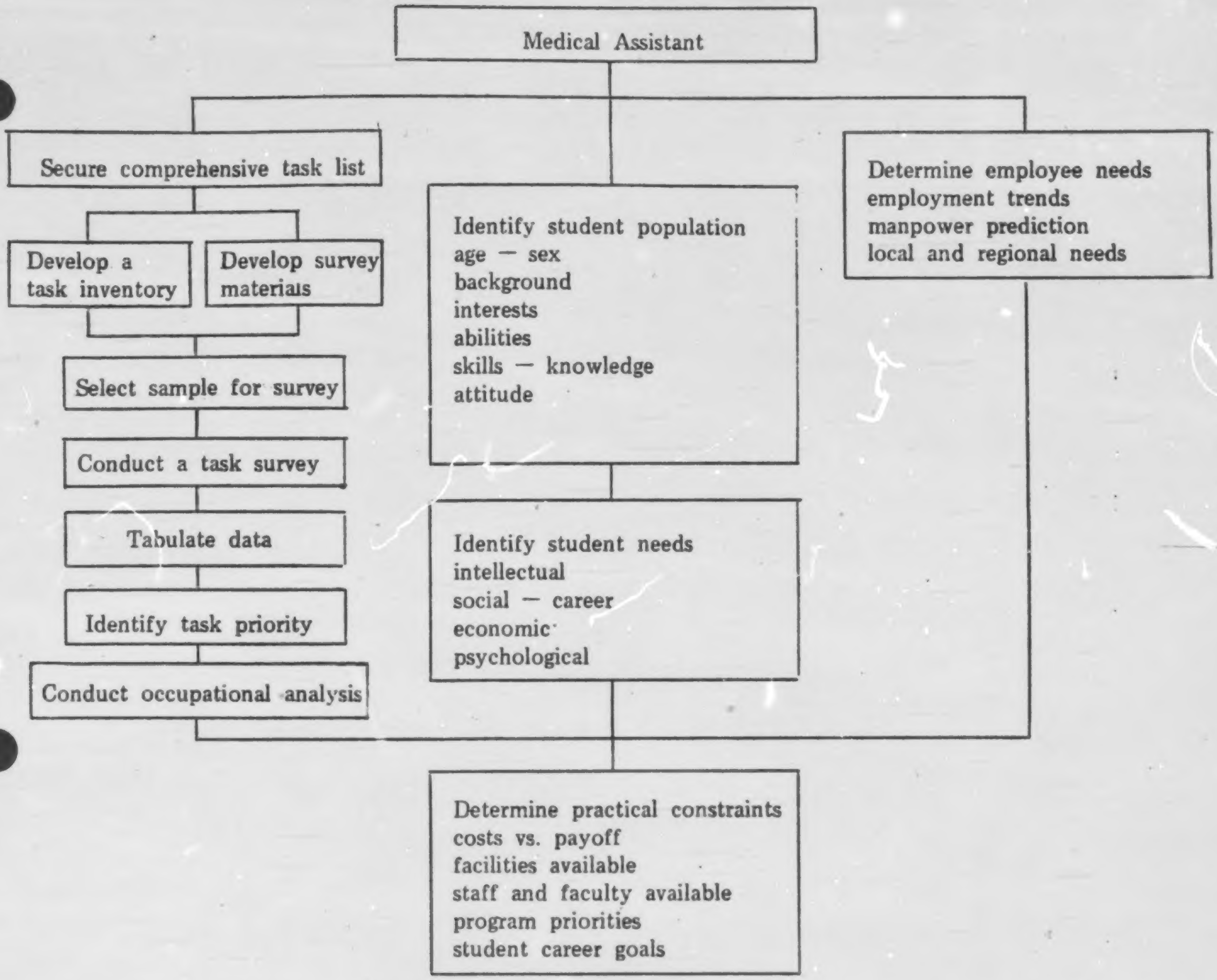
1. Secure comprehensive task list
2. Develop a task inventory
3. Develop survey materials
4. Select sample for survey
5. Conduct task survey
6. Tabulate data
7. Identify task priority
8. Conduct Occupational Analysis

The data from the task survey effort will yield valuable information which would be considered in respect to employment and student needs. It is in this effort that you are beginning to identify the job requirements, as the employers see them. The data yielded from the survey will provide inputs to identify the performances which will be included in the planned program, and will be required of the students.

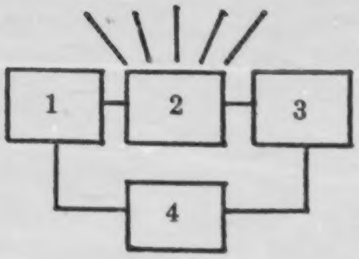


"The system must be tied to performance."

Once the data from these three sources has been gathered you must consider the practical constraints that may or may not exist. Practical constraints exist in the form of time, manpower, costs, facilities and other priorities along with any constraint identified from the data gathered from the previous three (3) sources. Any one constraint unless it can be overcome, will prevent your planned program from ever being successful.

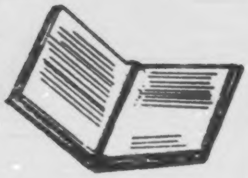

Medical Assistant
Secure comprehensive task list
Develop a task inventory
Develop survey materials
Select sample for survey
Conduct a task survey
Tabulate data
Identify task priority
Conduct occupational analysis
Identify student population
age — sex
background
interests
abilities
skills — knowledge
attitude
Identify student needs
intellectual
social — career
economic
psychological
Determine employee needs
employment trends
manpower prediction
local and regional needs
Determine practical constraints
costs vs. payoff
facilities available
staff and faculty available
program priorities
student career goals

PART # (2) - Training effort



Part Two (2) of the basic systems model starts after the decision has been made to develop and implement an instructional program.

As a starting point in Part Two (2) you would use the results of the task survey effort. The task survey has generated a list of duties and tasks for which instruction should be planned.

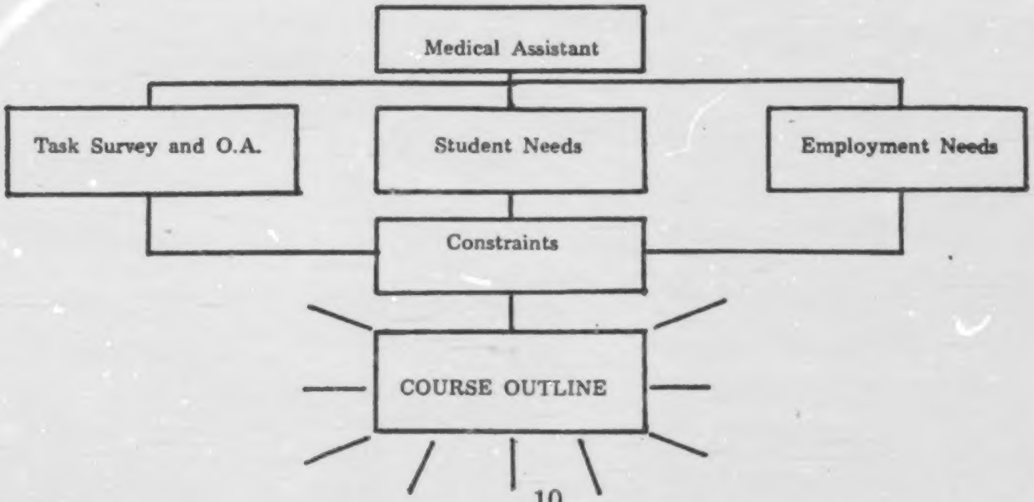


DUTY: Groupings of logically related tasks.

TASK: A logical unit of work in the performance of a duty. They are made up of a series of activities that occur in close sequence. They are related activities that usually have a definite beginning and end.

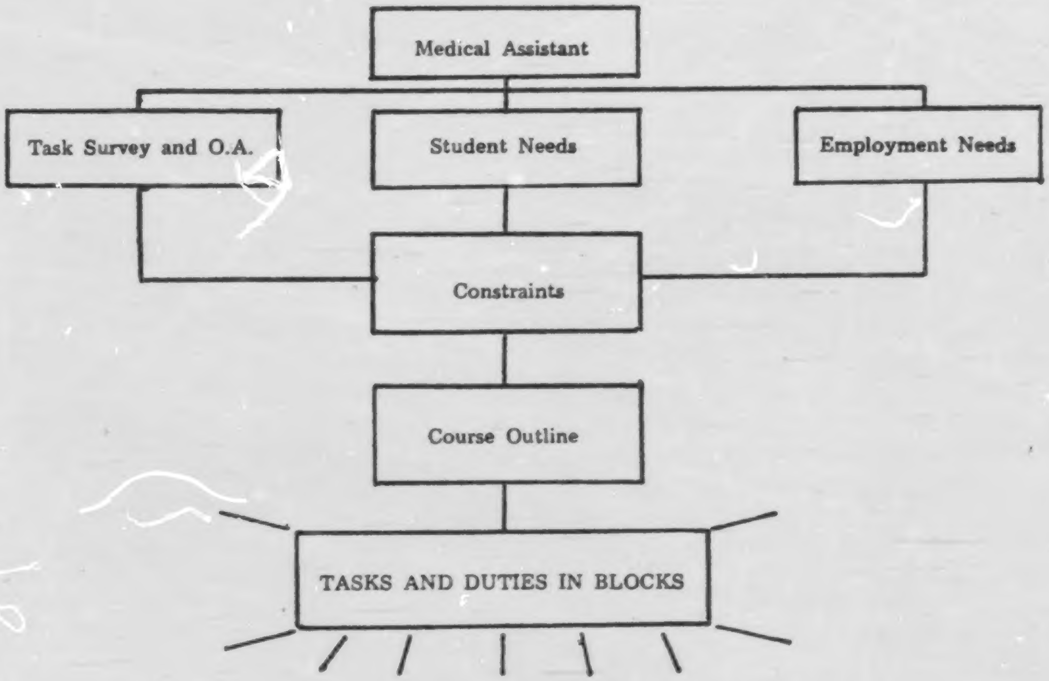
COURSE OUTLINE

This list of duties and their tasks can be organized into a course outline.


Medical Assistant
Task Survey and O.A.
Student Needs
Employment Needs
Constraints
COURSE OUTLINE

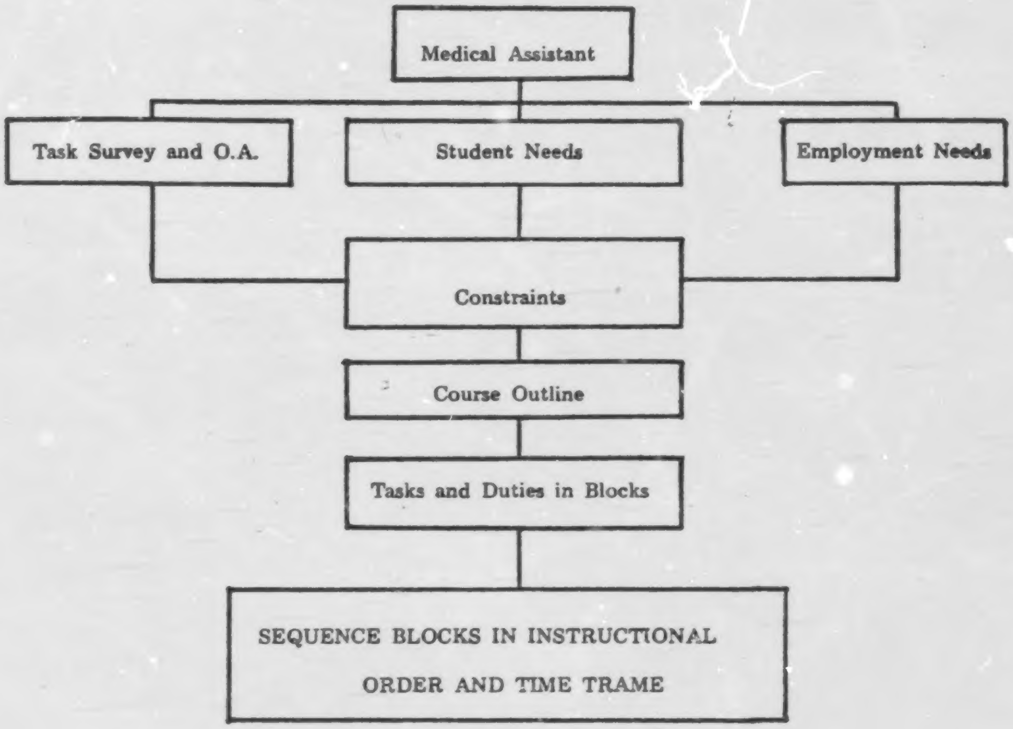
TASKS AND DUTIES INTO BLOCKS

As you organize the various tasks under the duties, and have listed them for the course outline you will notice that this outline may be further organized. In most occupations there are various duties and tasks that are logically related. There are duties and tasks that are logically taught together or in a close sequence. The next step suggests that you ORGANIZE the TASKS and DUTIES in these logical BLOCKS.


Medical Assistant
Task Survey and O.A.
Student Needs
Employment Needs
Constraints
Course Outline
TASKS AND DUTIES IN BLOCKS

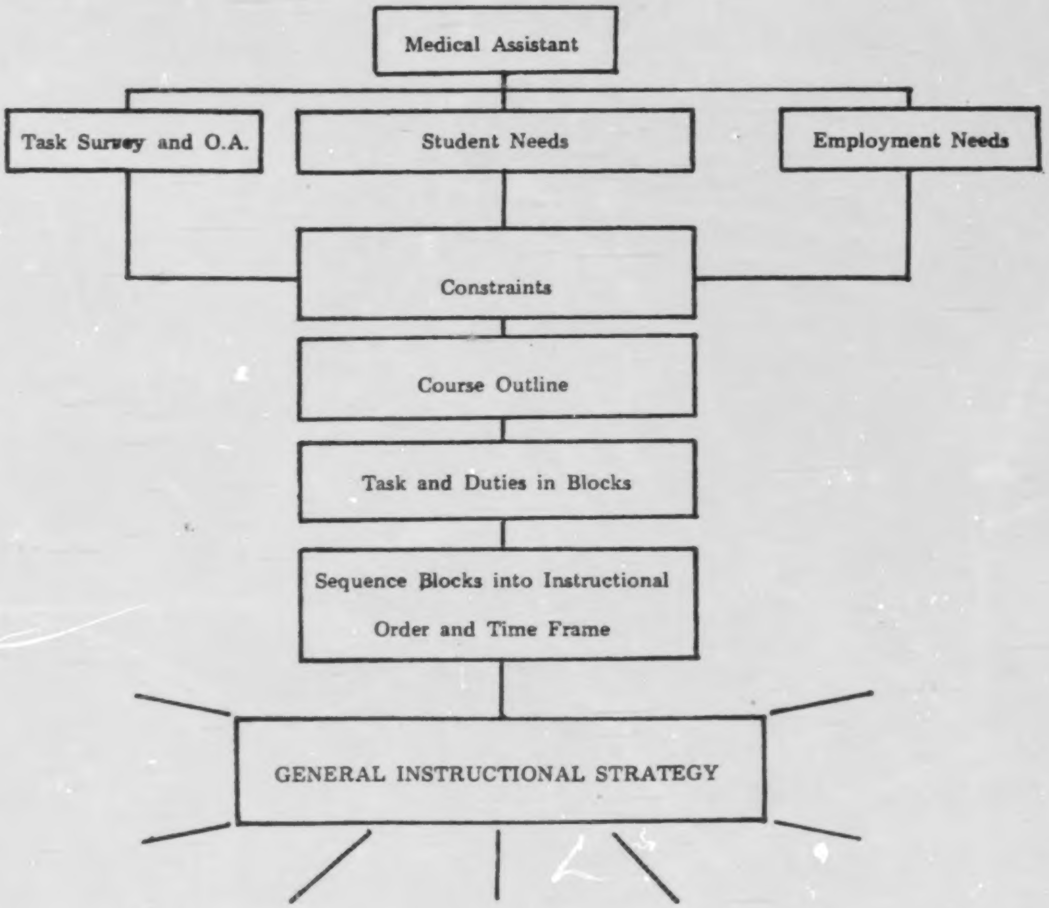
BLOCK SEQUENCE AND TIME FRAME

These blocks of duties and tasks may next be organized into an overall instructional sequence. Overall instructional sequence can mean that some blocks will be taught in the junior year, some the senior year, and some may overlap. These larger blocks can be sequenced into an order for instruction, within a relative time frame.


Medical Assistant
Task Survey and O.A.
Student Needs
Employment Needs
Constraints
Course Outline
Tasks and Duties in Blocks
SEQUENCE BLOCKS IN INSTRUCTIONAL ORDER AND TIME TRAME

GENERAL INSTRUCTIONAL STRATEGY

At this step consideration must be given as to how the instructional program must be organized in order to present all the instruction to all the students. Consideration of how to coordinate the logistics of fitting each student to the instructions must be given. There must be a clear relationship and strategy showing how the related class is coordinated with the laboratory class. A plan to handle the individual differences of the students must be considered. These and any of the strategies must take into consideration — the students, facilities, equipment, materials, principles of learning, and school policy.


Medical Assistant
Task Survey and O.A.
Student Needs
Employment Needs
Constraints
Course Outline
Task and Duties in Blocks
Sequence Blocks into Instructional Order and Time Frame
GENERAL INSTRUCTIONAL STRATEGY

TERMINAL PERFORMANCE OBJECTIVES

Before we can proceed any further in the systems we must write performance objectives for each task to be taught.

PERFORMANCE OBJECTIVE:

> "A statement that expresses in behavioral terms the intended performance out come for the student following a specific learning experience; a description of measurable behavior."

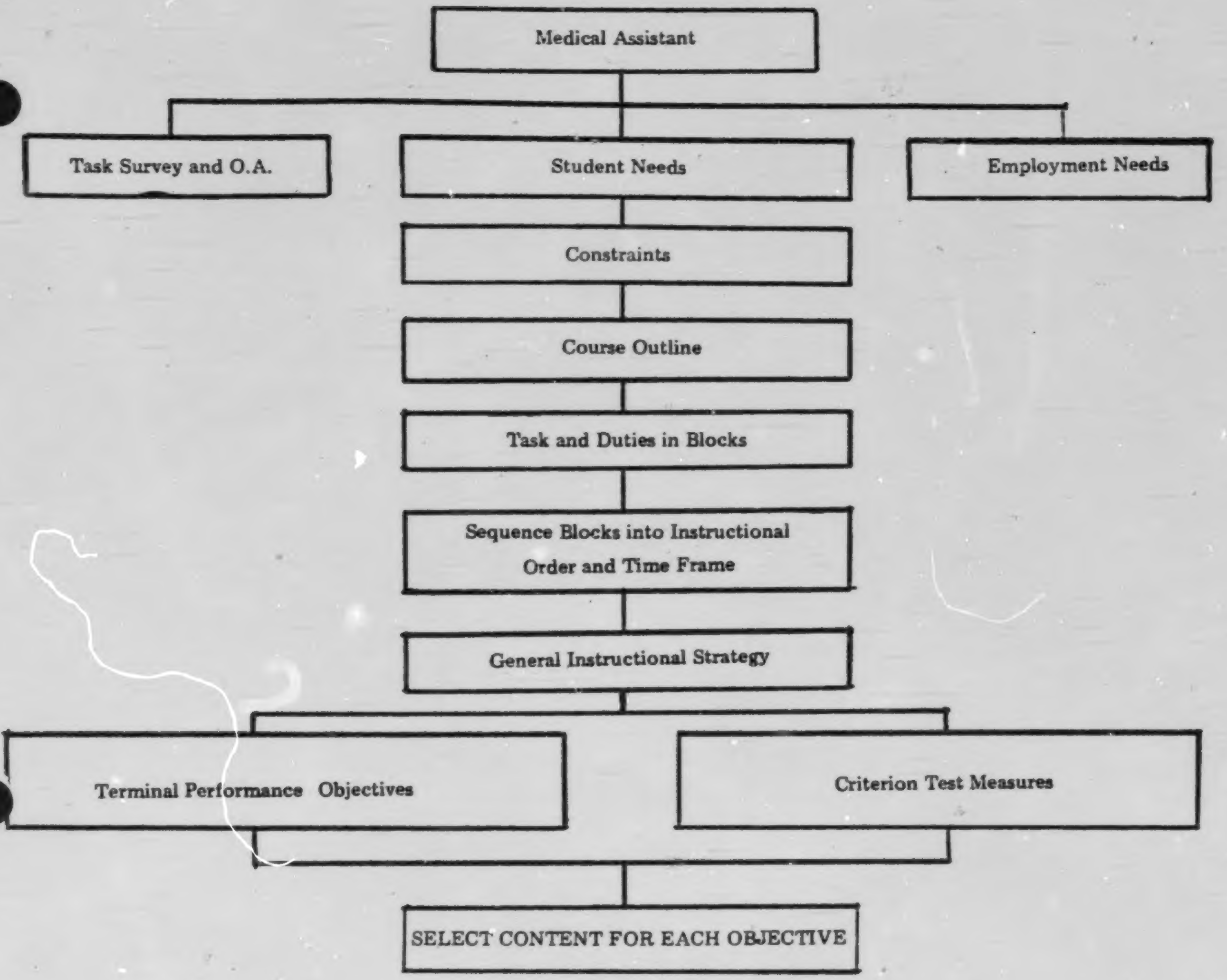
We must state the performance objectives in terms of output behaviors. Without these behaviors there will be little basis for deciding which teaching strategy to use, what type of learning takes place, or what skills and knowledge must be taught. Without performance objectives there is no real means of determining the degree of instructional effectiveness. If you cannot determine the effectiveness of the instruction how can you make revision. Without performance objectives true individualized instruction tailored to student's individual needs will never occur. Individualized instruction considering study needs relies on a step by step instruction process that can be effectively measured at each step.

The key to the systems design process is the identification of the desired behaviors, the specification of what controls those behaviors, and the determination of the techniques needed to shape those behaviors.

SELECT CONTENT FOR EACH OBJECTIVE

After you have the duties and tasks listed, and the terminal performance objectives written you are ready to select the specific content. You may utilize the occupational analysis and subject matter specialist to determine precisely what the students must be taught in order to achieve the objective. The nature and scope of the content is governed by the performance objectives. The end performance dictates what the student must be taught. You must accurately determine those skills and knowledge that are necessary to the stated performance. The occupational analysis will serve as a resource document for this selection of content. The subject matter specialist should correlate specific content details to the stated performance.

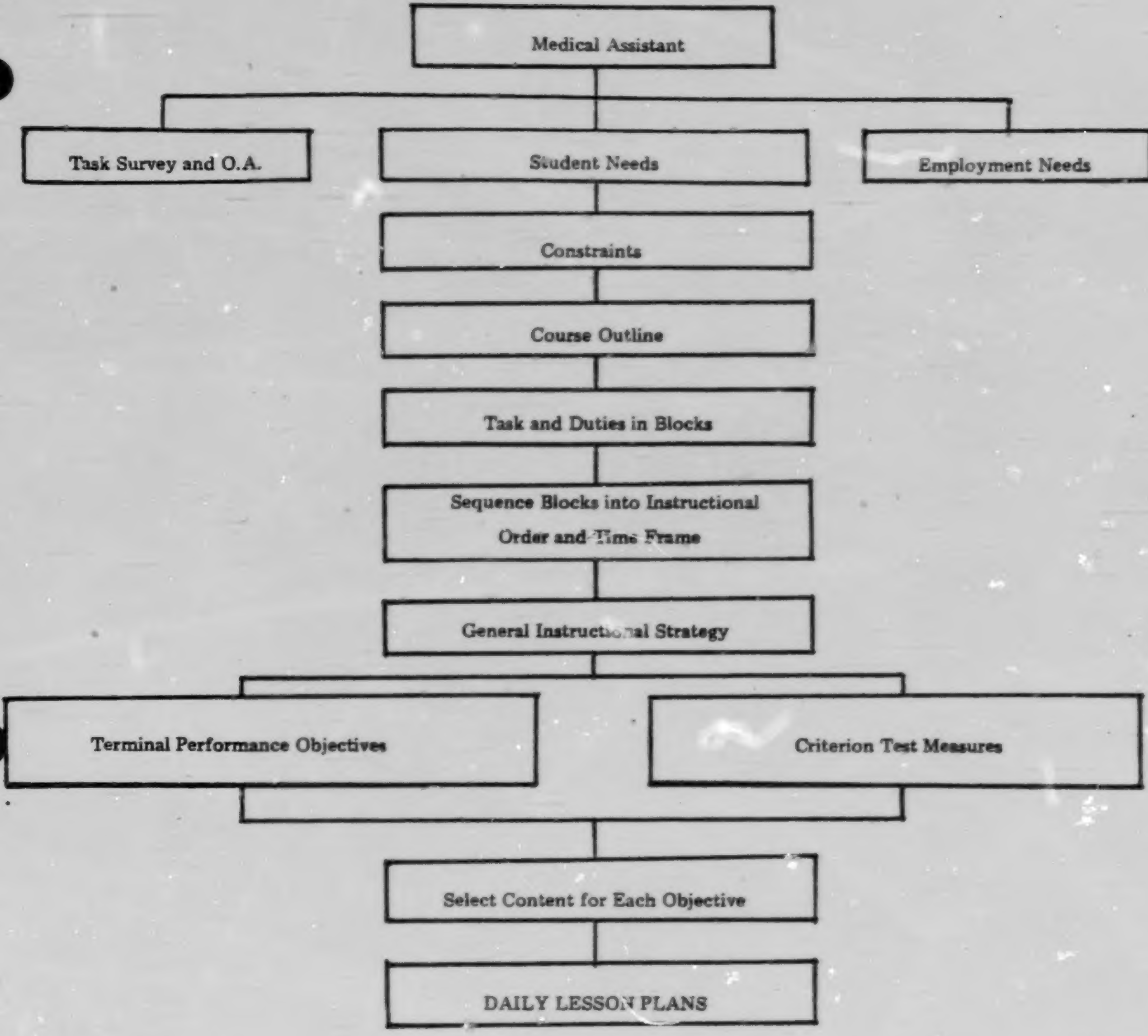
The instructional system is a set of interrelated, interacting, precisely controlled learning experiences that are designed to achieve a specific set of performance objectives, but organized into a unified, dynamic whole which is responsive and adaptive to the individual student while fulfilling specific job relevant criteria.


Medical Assistant
Task Survey and O.A.
Student Needs
Employment Needs
Constraints
Course Outline
Task and Duties in Blocks
Sequence Blocks into Instructional Order and Time Frame
General Instructional Strategy
Terminal Performance Objectives
Criterion Test Measures
SELECT CONTENT FOR EACH OBJECTIVE

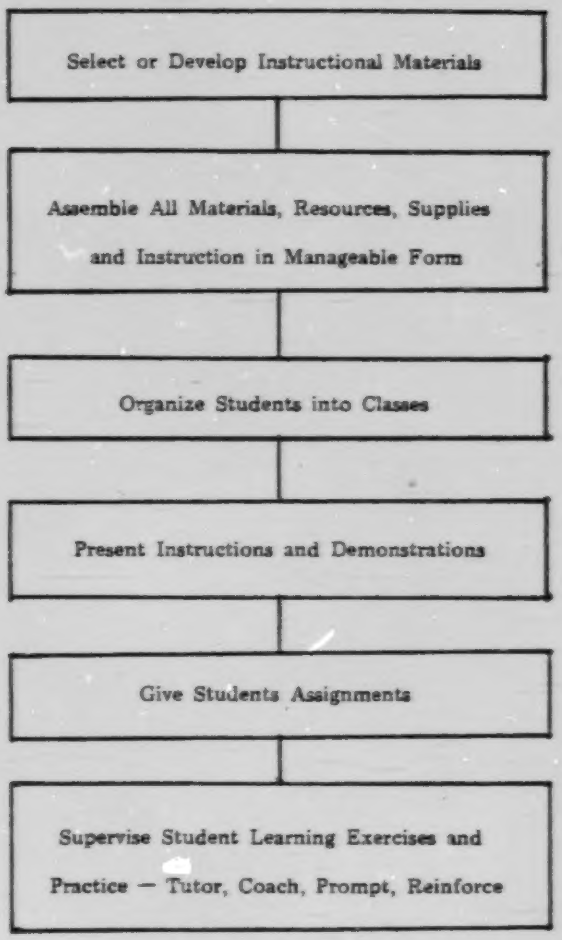
DAILY LESSON PLANS

Once we have stated the performance objectives and selected the content we must develop daily lessons. Lesson plans vary in their structure and appearance, but must include what to teach and how to teach it. Lesson plans must consider the following:

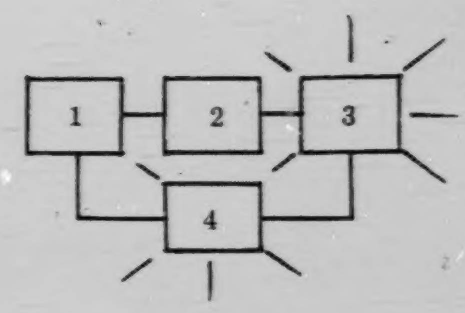
1. content
2. sequence of content
3. student motivation
4. performance objective
5. teaching methods
6. time
7. instructional aids
8. instructional materials
9. demonstration
10. discussion
11. student practice
12. student preassessment
13. tools — equipment
14. learning experiences
15. principles of learning
16. evaluation


Medical Assistant
Task Survey and O.A.
Student Needs
Employment Needs
Constraints
Course Outline
Task and Duties in Blocks
Sequence Blocks into Instructional Order and Time Frame
General Instructional Strategy
Terminal Performance Objectives
Criterion Test Measures
Select Content for Each Objective
DAILY LESSON PLANS

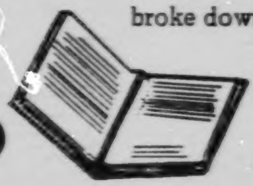
The following steps in an instructional system are but samples of what may occur. These steps and any that you may add are involved in activities that immediately proceed instruction and the act of instruction itself. Since this module addresses the design of the total system, and not the act of instruction we will only show the relationships of the steps to the system.


Select or Develop Instructional Materials
Assemble All Materials, Resources, Supplies and Instruction in Manageable Form
Organize Students into Classes
Present Instructions and Demonstrations
Give Students Assignments
Supervise Student Learning Exercises and Practice — Tutor, Coach, Prompt, Reinforce

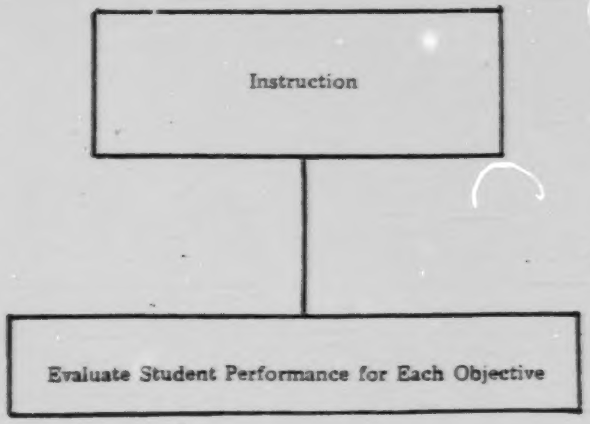
PART # (3/4) -
"Evaluate training effort"
FEEDBACK



The evaluation activity starts with an implementation of the procedures that have been designed in preceeding steps. Typically this involves the administration of end of — unit or end — of — sequence criteria tests. The test measures the extent to which the needs and objectives have been met. Since the evaluation precisely measures growth the planning of evaluation should be viewed as an integral part of the instructional process. The evaluative data collected by looking at the achievement of objectives, makes it possible to isolate precise areas when competencies and skills have not been mastered. In other words, where the learning process broke down.



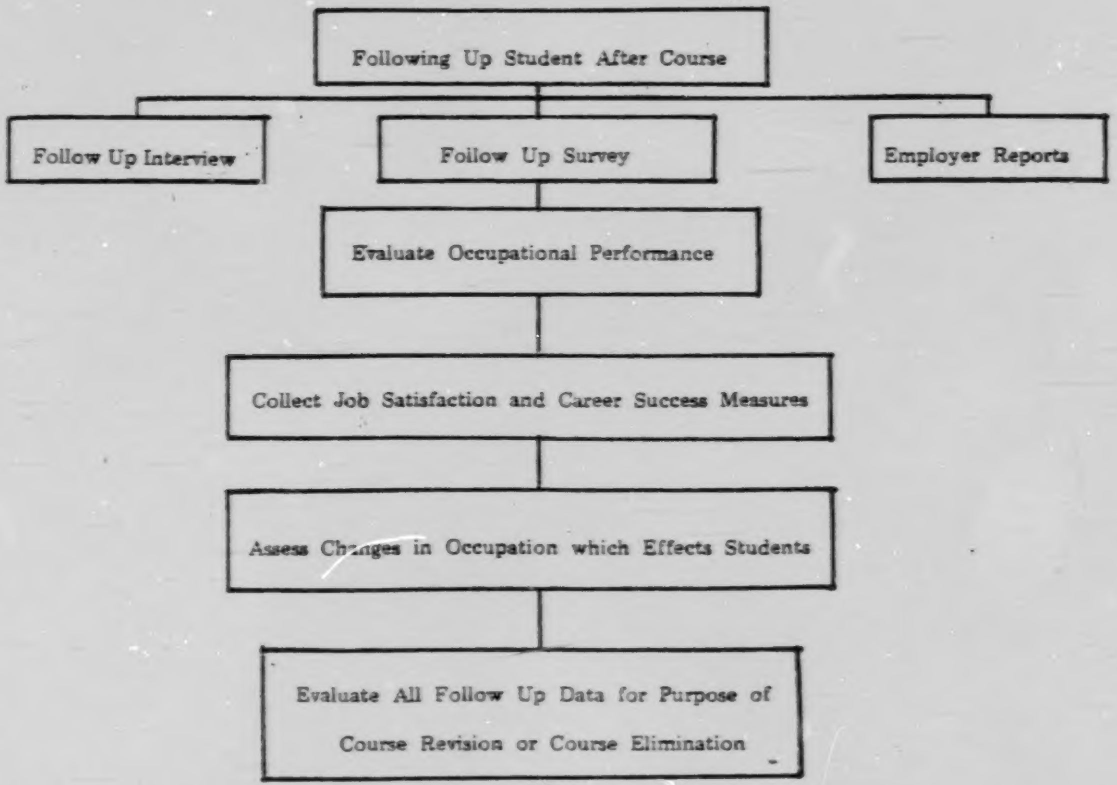
A properly developed "SYSTEM" cannot fail to help the student change from a "can't do" state to a "can do" state. It cannot fail, because therein lies the essence of its design logic. This logic demands that the objective be obtained — that the students have learned — before the system itself attains stability and remains at "rest."



REVISE COURSE CONTENT AND PRACTICE WHERE STUDENTS FAIL TO MEET OBJECTIVES

Any time an objective is not met, necessary revision is required. By knowing precisely where problems occur, we can make precise revisions. This step of the systems approach is very critical, and is the important feature of this model. When instruction can not be looked at and its shortcomings precisely isolated, the designers of the instructed program will not know where to revise and improve. It is this evaluation and feed-back feature of the model that makes it a closed loop, self correcting model. Within the systems concept you must see that there is a second dimension of evaluation. Not only does the evaluate the student and his learning capacity, but the instructional material and the program itself. The sum total of the student's performance reflects not only their own capacities, but the nature and effectiveness of the instructional program.

In the systems approach, program and student evaluation data is continually sought and analyzed. Remember, the program had its beginning based on needs and objectives. The program must be monitored at all levels to see if the needs still exist and are being met. This continued assessment involves:


Following Up Student After Course
Follow Up Interview
Follow Up Survey
Employer Reports
Evaluate Occupational Performance
Collect Job Satisfaction and Career Success Measures
Assess Changes in Occupation which Effects Students
Evaluate All Follow Up Data for Purpose of Course Revision or Course Elimination

FEEDBACK IN THE SYSTEM

Remember, earlier we stated that a system is a self-correcting, closed loop strategy. This basic characteristic of a system is made possible by a feedback mechanism. Notice, in the large model there are bold lines feeding back to earlier stages. These feedback lines originate from the revision stages. By building into the model these feedback lines, we have created the closed loop that we speak of.

The feedback characteristic of the system is always preceeded by collecting and analyzing evaluative data. When analyzed, this data will tell us the extent to which we have met the needs and objectives. One of the shortcomings of most instruction as it presently occurs is that the results of the instructional process are not systematically collected nor fed back to be incorporated into course revision or redesign. Without the feedback component the system and the instruction cannot be self-improving. Instructors with weak programs will continue to have weak programs.

This feedback mechanism is the most important component of the system.

SUMMARY

The overall purpose of this module has been to deal briefly with the elements and steps of a systems approach to designing and managing instruction. Considerably more detail will be presented in other parts of this workshop. What has been attempted by this module has been to handle the major characteristics of the systems model. The model that has been presently analyzed has been presented as a tool for identifying the major steps of the system. This model is intended to be added to/substracted from and customized to any of your particular needs. You should be able to adapt this model while maintaining its important elements and features.

All systems require structure:

1. Objectives stated in operational language that is meaningful to all who will employ the results.
2. A common language be designed.
3. "Barriers" must be explicitly considered.
4. A schedule must be employed.
5. Must have a plan.
6. The results must appear in a meaningful format.
7. The total output must be related to the objectives.

The process of applying the systems approach in instructional systems development is the orderly process of:

1. Analyzing job performance requirements
2. Translating job performance requirements into behaviorally stated learning objectives.
3. Identifying level resources, instructional procedures and techniques to provide instruction.
4. Assuring achievement of the behavioral objectives and confirm that these objectives fully support the job performance requirements.

Whatever model you choose to design and use in the systems approach to instruction of the above characteristics and steps are included you will produce a testable system. This very important concept finds its value in that the system is always subject to refinement and improvement in terms of student learning.

EXERCISES

1. When gathering data to satisfy employment needs we list the following in one Employment trends, manpower predictions, and local/regional needs.

In the space provided in the block list any additional factors your school considered or could consider.

Medical Assistant

Determine Employment Needs
  a. employment trends
  b. manpower predictions
  c. local-regional need
  d.
  e.
  f.
  g.
  h.
  i.

2. Explain how your school could implement a process to collect this data.

3. In order to consider student needs we have to identify the student population. In step 4 we listed the following:

Age—sex, background, interests, abilities, skills — knowledge, and attitudes. In the space provided in the block list any additional factors that your school considers or could consider.

Medical Assistant

Identify Student Population
- a. age — sex
- b. background
- c. interests
- d. abilities
- e. skill — knowledges
- f. attitudes
- g.
- h.
- i.
- j.

4. Explain how your school could implement or process to collect this data.

5. When considering students and their needs we listed in this block Intellectual, social — career, economic, and psychological. In the space provided in the block list any additional factors that your school is considering or could consider.

Medical Assistant

Identify Student Population

Identify Student Needs
- a. intellectual
- b. social — career
- c. economic
- d. psychological
- e.
- f.
- g.
- h.

6. Explain how your school might implement a process to collect this data.

EXERCISE

When designing instructional systems the concept of evaluation and feedback is most important. When implemented, this concept insures a self correcting system.

7. What strategies do you and your school use to insure a self correcting instructional system?

8. How could you implement a strategy that would insure a self correcting instructional system in your class or school? Explain how each step of the evaluation and feedback process would be implemented.

VI. Task Survey

PART A: RATIONALE FOR USE OF TASK SURVEYS

This section is designed to give you an overview of the task survey process. It outlines the three phases of the process and the steps contained in each.

PERFORMANCE OBJECTIVE:

After reading the following section, the workshop participants will identify all the correct characteristics of task survey data.

RESOURCES:

Reading:	pp. 1 - 2	"Rationale for Using Task Surveys"
	pp. 3 - 6	"Final Report on Vocational Education" Battelle Memorial Institute
Activity:	pg. 7	
Feedback:	pg. 8	

Rationale for Using Task Surveys

Information from many sources can be utilized to properly develop a program in vocational education that will prepare a student with satisfactory employment skills and knowledge for entry into a specified occupation. Common sources of information about an occupation are career handbooks, text books, trade journals, industrial publications, government publications, individuals with work experience in the occupation, advisory committees, employment statistics, and union or trade association contracts and bulletins. All of these sources can help educators to develop a clear picture of an occupation and the types of processes used, products produced and/or workers employed.

All of the above sources provide information of various types but some are not designed to primarily provide information for curriculum design and development. The occupational task survey technique produces curriculum data that is economical, reliable, quantifiable and valid. The data can be used directly in curriculum development decision making and course planning. Task survey data can identify the differences and similarities of jobs across a range of employment agencies and across various geographic areas. (Employment agencies as used here refers to the companies, business, industries and/or institutions which provide jobs and employ workers in any of the occupations you are surveying.)

Task survey information can identify the tasks most often performed, the numbers of workers performing different tasks, and the tasks most important for entry level and advanced positions. The task survey procedure involves three phases each containing a few simple and relatively inexpensive steps:

> Phase I: Development of the Task Inventory
>
> The first phase of the survey involves obtaining or developing a list of the tasks performed in the occupation, selecting the tasks to be used, and determining relevant questions to be asked in the task inventory. This phase can be shortened by using a task list already developed and available to the public.
>
> Phase II: Acquisition of Survey Data
>
> During the second phase the survey components are developed, the population to be surveyed is identified, sample size is determined, a representative sample of workers selected, the survey distributed and the responses collected.
>
> Phase III: Treating the Data
>
> After the responses have been collected the results are tabulated and compiled; appropriate statistics are performed, the data analyzed for significant numbers, percentages, trends, or other types of evidence

> related to the questions asked; the data interpreted; and conclusions are drawn which can be considered in selecting and designing curriculum for an instructional program.

Since much vocational curriculum is planned and developed by vocational instructors and supervisors the task survey provides direct support to their efforts. Sometimes in the curriculum development process there is a tendency to include content or skills which are not essential or which are more practical to learn on the job. Survey data can correct that tendency by providing a basis for identifying the content and skills which are actually used by incumbents in a given occupation. The practical question of "what are the entry level tasks" can be specifically answered by employers and workers. It is possible to identify critical competencies required to enable a new worker to be successful on the job. It is also possible to determine the exact tasks to be learned and then to indicate the degree to which each student learns them.

FINAL REPORT

on

VOCATIONAL EDUCATION

to

OHIO DEPARTMENT OF EDUCATION

October, 1969

BATTELLE MEMORIAL INSTITUTE
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

"The following materials is a portion of the recommendations made to the State Department of Education in a state-wide study by the Battelle Memorial Institute, dated 1969."

Obtaining Employer and Job Requirement Information

The overall purpose of this step is to obtain information on tasks that need to be performed for a given job or occupation, and assess and define the skills, knowledge, and attitudes required to perform them. For a given job, what tasks and skills would employer's like the school to teach? What tasks and skills are required for successful job performance? These are the major questions here.

A major problem here for vocational education is keeping such information current, in view of rapid equipment and skill requirements change for many occupations. Another major problem is to obtain employer and job requirement information in an appropriate form, i.e., well-defined and specific task and skill information is needed, if it is to be useful for subsequent steps in program development. A third problem is to obtain comprehensive information, i.e., a description of required tasks and skills for a trade in the several establishments and work settings where the trade is practiced. Differences and commonalities can then be assessed.

The problem of updating job requirements information will be discussed later (see section on follow-up of graduates). The concern here is with obtaining such information initially, for a given job training program.

In general, current practices call for the use of advisory and/or craft committees to obtain employer and job requirement data. The activities of these committees could be valuably supplemented by a survey methodology, to obtain more comprehensive, specific, and well-defined task and skill requirement information.

Battelle is currently implementing and validating such a methodology on a research project with the U.S. Department of Labor and schools in the State of Michigan*.

The approach calls for defining and listing the tasks an individual performs on the job, and a grouping of these tasks into task classes. Tasks are defined at the level of detail required for subsequent development of a training program for the job. For each task, several items of information are obtained, as follows: (1) importance of the task for (a) hiring, (b) job success, and (c) promotion; (2) frequency of performance of the task; (3) to what extent the employer desires that the task be taught in the curriculum, if at all; and (4) level of performance required on the task. These sources of information are useful for curriculum design, including selection of aspects of the job to teach, if time/costs preclude the teaching of all job tasks.

The steps required of a local district to obtain such information can be briefly described as below:

(1) First, a comprehensive preliminary list of job tasks for each job in the curriculum would be developed. Teachers, or other experts, would develop this preliminary list, based on their expertise and any existing written curriculum materials.

(2) The second step would be to select establishments for each job and trade of concern. That is, establishments in the area would be selected where the job or jobs exist. Such selection would be based on a well-thought out sampling to obtain a representative group of establishments.

(3) The last step would be to conduct a mail survey of the establishments selected. The preliminary task list would be sent to appropriate personnel in the establishments, such as people actually working on the job, first line

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* Cress, Ronald J., "An Exploratory Study to Analyze New Skill Content in Selected Occupations in Michigan and the Mechanism for Its Translation into Vocational Education Curricula." Interim Report. August, 1969.

> supervisors, or any other type of person judged competent to give the information required. These people would then add relevant tasks, if necessary, to the preliminary task list, or remove irrelevant tasks. They would then provide information on importance of the task, frequency of performing the task, etc., as described above. They would also provide information on equipment, tools, materials, and instruments required in the performance of the tasks.

As pointed out previously, the above procedure is viewed as a supplement to advisory committees for reflecting employer skill needs, providing more specific and comprehensive information (across employer establishments) than can be obtained by a committee procedure. The procedure is also viewed as a supplement to periodic training of staff instructors by OJT or other means, to keep them updated in their job speciality, to insure relevant job training curricular objectives and content.

ACTIVITY: Check all the phrases that correctly identify the characteristic of task survey data.

Task survey data can:

a. ______provide information for curriculum design

b. ______replace recommendations by advisory committees

c. ______identify differences and similarities of jobs across a range of employment agencies and geographic areas

d. ______determine cost/effectiveness of programs

e. ______identify tasks most important for entry level and advanced positions

f. ______identify numbers of workers performing different tasks

g. ______specify skills to be taught

h. ______identify tasks most often performed

FEEDBACK:

The correct answers are a, c, e, f, and h.

You should not have checked b, d, or g. During all phases of the task survey process it is recommended that the advisory committee have input. The task survey data can tell you only about the tasks, not about the instructional program. The task survey data can only identify certain facts, not specify skills, knowledge or competencies that should be taught. Task survey data can provide a basis for identifying skills, knowledge or competencies through the task analysis procedure.

PART B: DEVELOPING A TASK LIST

This section gives you a definition of a task, task list, and task inventory. It explains how to develop and edit task lists according to the set of standards provided.

PERFORMANCE OBJECTIVE:

After reading this section, the workshop participants will edit a list of task statements, identify all correctly written statements, rewrite poorly written statements and delete those statements that cannot be rewritten.

RESOURCES:

Reading:	pg. 1 "Obtaining an Occupational Task List" pp. 1-2 "Selecting the Tasks" pp. 3-4 "Appendix B: Task Definition and Rules of Construction"
Activity:	pg. 5
Feedback:	pg. 6

Obtaining an Occupational Task List

A task list is a comprehensive list of statements which define actual units of work performed by incumbents in a specified occupation. Such lists describe what people do when carrying out their job responsibilities. The list may be compiled from a number of sources including job descriptions, training materials, worker interviews, observations, and simulations.

The task statements contained in a list should be written and edited according to a set of standards to maintain consistency in the level of specificity and style. The first draft, of the task list should be reviewed by a representative sample of workers and/or employers from the occupation. They should identify incorrect language and add any task statements that may be missing from the original list. The appropriate changes and additions are then made on the final draft of the task list.

The task lists contained in the analysis underwent the above procedures. The initial lists were developed from a review of training guides, curriculum materials, course outlines, and research documents. They were edited and reviewed by a small sample of workers. The re-edited list was then mailed as part of a survey to a representative sample of workers (40-50) employed in the occupation. These workers indicated how often they performed the tasks and added tasks they performed that were not included in the inventory.

Selecting the Tasks

The presurvey procedure involves selecting the tasks and relevant questions to be included in the task inventory. The task inventory is that part of the survey instrument that contains the task statements and the questions about each task. (See Figure 1.) The task statements are to be selected from the task list developed in the first step. The task statements should be reviewed to determine if the task statements as written meet the local needs. Some statements may be too general for identifying specific related skills or content and should be rewritten as several more specific task statements. The number of task statements in a task inventory may vary from 50 to 300 task statements depending on the scope of the occupation to be surveyed and the specificity of each statement. A lengthy inventory will discourage participation by respondents. A total of 200 to 300 task statements are suggested as approaching a maximum number to include.

An extensive list requires that specific task statements be selected for inclusion in the task inventory. A review of the statements contained in the task list may identify certain

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* See Appendix B for task definition and rules of construction

tasks which are not considered for instruction. The reasons for not including such tasks may be:

1. Lack of facilities or equipment for proper training
2. There is nothing about the task that requires training
3. Job training is a superior method to formal school for learning
4. The tasks are reserved for master craftsmen and will not be expected of entry level workers
5. Advanced license or certification is required before performance is allowed

Some tasks are so basic to an occupation that they will automatically be included in a course. Such tasks can be deleted if necessary to reduce the number of tasks on the list. Caution should be exercised in making arbitrary decisions to delete tasks from the list even though the reasons for doing so may seem valid. If the practice of predetermining the tasks to be or not be included in an inventory is overdone the main purpose of the task survey will be circumvented. A more appropriate approach is, (1) rewrite the task statements rather than delete them, or (2) develop and conduct two surveys with two separate groups of workers. Each group would respond to half the large task inventory. The results can be combined in the final analysis.

APPENDIX B: TASK DEFINITION AND RULES OF CONSTRUCTION

Definition:

A task is a logical and necessary unit of work in the performance of a duty.

Some properties of tasks:

1. A task has a definite beginning and end.
2. Tasks are made up of a series of worker activities that occur in close sequence.
3. A task includes a mixture of decisions, perceptions and/or physical activities required of one person.
4. A task involves peoples' interaction with equipment, other people, and/or data.

Standards for writing and/or editing task statements:

1. Clarity requires that a task statement identify without question the unit of work to be performed.

Rules:

Use wording that is easily understood.

Be precise so the statement means the same thing to all personnel.

Write separate, specific statements for each task.

Avoid combining vague items of skill, knowledge or responsibility.

2. Completeness requires that all necessary information be included in the statement so it may be fully understood across various work environments.

Rules:

Avoid the use of abbreviations. Spell out the term followed by the abbreviation.

Include the title or identification of special tools, forms or equipment when the task statement requires such specific items to be correctly understood. Use the general type of term when it is sufficient.

3. Conciseness requires that the task statement provide all necessary information in as few words as possible. They should be accurate and to the point.

Rules:

Task statements should be brief. Avoid using statements which are too broad or general in meaning.

Avoid use of vague words such as "check," "assist," and "use."

Begin the statements with a present-tense action word.

The subject "I" or "You" is understood but not written.

Identify the object on which the action is to be performed.

Use current occupational terminology.

4. Relevance requires that the task statement provide information which describes the direct action of the worker.

Rules:

Do not state the person's qualifications.

Do not include items on receiving instruction, unless actual work is performed.

Avoid including information about prior tasks whenever possible.

Do not use multiple verbs unless several actions are always done together.

ACTIVITY: Edit the following list of task statements according to the standards discussed in Appendix B. Check those statements that are correctly written. Rewrite those statements that are poorly written. Delete those statements that cannot be rewritten.

1. ______Type names and addresses for mailing lists
2. ______Remove addresses from mailing lists
3. ______Involved with determining problems
4. ______File address lists
5. ______Handle correspondence
6. ______Fill out 100W purchase order
7. ______Report various activities performed
8. ______Prepare cost estimates for O.J.T.
9. ______Erect temporary scaffolding
10. ______Write production reports
11. ______I perform all essential repairs
12. ______Proofread memos
13. ______Test circuits with multimeter
14. ______Learn the split-half trouble shooting techniques
15. ______Able to write correct objectives
16. ______Read disassembly procedures and disassemble internal valve
17. ______Adjust internal valves in fluid coupling
18. ______Type 60 words per minute with no errors
19. ______Replace main fuse in power console
20. ______Scheduling workshop sessions
21. ______Perform $\sqrt{x}$ function
22. ______Fill back orders
23. ______Report attendance figures
24. ______Tabulating survey data

FEEDBACK:

You should have checked: 1, 2, 4, 6, 9, 10, 12, 13, 17, 19, 22, 23,

You should have deleted: 3, 11, 14, 21.

Statement five does not specify what action is to be taken and therefore does not meet the standard for clarity. It can be rewritten as:

"Compose replies to correspondence" or "Open correspondence," etc.

Statement seven does not specify what activities should be reported and therefore does not meet the standard of completeness. It can be rewritten as:

"Fillout weekly report form"

Statement eight contains an undefined abbreviation and does not meet the standard of completeness. It can be rewritten as:

"Prepare cost estimates for on the job training"

Statement fifteen relates to abilities not to actual performance and does not meet the standard of relevance. It can be rewritten as:

"Write objectives for workshop (class, course, etc.)"

Statement sixteen includes non-essential information about a prior task and does not meet the standard of relevance. The first phrase can be deleted to leave it:

"Disassemble internal valve"

Statement eighteen relates to abilities not to actual performance and does not meet the standard of relevance. It can be rewritten as:

"Type business letters" or "Type manuscripts" etc.

Statement twenty begins with a gerund, not a present tense action verb and does not meet the standard of conciseness. It should be rewritten as:

"Schedule workshop sessions"

Statement twenty-four begins with a gerund, not a present tense action verb and does not meet the standard of conciseness. It should be rewritten as:

"Tabulate survey data"

PART C: DETERMINING RELEVANT QUESTIONS

This section discusses some of the questions that can be asked on a task inventory and some of the techniques of selecting questions and devising rating scales.

PERFORMANCE OBJECTIVE:

After reading this section the workshop participants will identify essential criteria for developing questions and rating scales for task inventories, list the kinds of data that can be generated by different kinds of questions and give the questions a priority rating in a group discussion.

RESOURCES:

Reading: pg. 1 "Determining the Questions"

Activity: pg. 2

Feedback: pg. 3

Determining the Questions

Another decision in developing a task inventory is selecting the questions to be asked about each task. The data from these questions should aid directly in the design and development of a vocational course. A large number of questions about each task will discourage participation by respondents. Three questions are suggested as a maximum. To gather data for more than three questions develop two inventories with different questions on each. This approach is also used when surveying two different groups such as employers and employees. Ideally, the questions selected should provide the greatest amount of information and guidance for the least time spent on the part of the respondents.

Some questions that might be asked are:

How often is each task performed by a job incumbent?
How much time is spent performing each task?
How important is each task to the effective execution of the job?
How soon is task competence expected after job assignment?
Can essential training be adequately acquired on the job?
Is the task part of entry level jobs?

Other questions that are particular to local needs may be asked on the task inventory. The type of questions may vary depending on the group that is to respond such as employers, employees, or others.

An appropriate rating scale must be devised for each question. A rating scale of not less than five points and perhaps seven points when measuring such questions as importance or criticality figures is recommended. (See Figure 2.) Such a scale will give a greater amount of discrimination between tasks. Smaller scales (3 or 4 points) may be less effective because all responses may be at one extreme of the scale; such results will produce mean values for all tasks which are not significantly different from each other. Each point of the scale should be identified and explained carefully on the instruction sheet. Additional specific directions on how to mark the appropriate response should be clearly printed on each page of the inventory.

Task Inventory	Flexible	Average	Above Av.	Critical	Highly Critical
1.	1	2	3	4	5
2.	1	2	3	4	5

Figure 2

ACTIVITY:

1. Fill in the blanks of this summary paragrpah.

   There should be no more than __________ questions asked about each task on a task inventory. If different information is needed from different groups, use __________ inventories. Each question should have a rating scale of no less than __________ points. This gives a greater amount of __________ between tasks. Each point on the rating scale should be __________ on the instruction sheet.

2. A list of possible kinds of data that can be obtained from task inventories is listed on the right. Five questions that can be used to obtain that data is listed on the left. Match the data with the questions that can be used to obtain it. Some kinds of data can be obtained by more than one question.

__________ 1. How often is each task performed by a job incumbent?

__________ 2. How much time is spent performing each task?

__________ 3. How important is each task to occupational success?

__________ 4. How critical is correct task performance relative to all other tasks?

__________ 5. How soon is task competence expected after job assignment?

a. percent of workers who perform that task
b. tasks most often performed
c. most important tasks as identified by workers
d. tasks that require least margin of error in performance
e. indicates entry level tasks
f. most important tasks to be able to perform
g. percent of workers' time spent on each task in relation to all other tasks
h. most important tasks as identified by supervisors
i. tasks that may need extra training
j. indicates advanced level tasks

3. DISCUSSION POINT:

   Take into consideration your particular position in your school structure. If you were running a survey what kind of data would you need? What kind of questions would you ask to obtain that data? How do your choices compare to the rest of your group? List group consensus on what are the most appropriate questions.

   1.
   2.
   3.

FEEDBACK:

1. There should be no more than 3 questions asked about each task on a task inventory. If different information is needed from different groups, use different/several inventories. Each question should have a rating scale of not less than 5 points. This gives a greater amount of discrimination between tasks. Each point of the rating scale should be explained on the information sheet.

2. Question 1: a, b, i
   Question 2: a, b, g, i
   Question 3: a, c, h, i
   Question 4: a, d, i
   Question 5: e, j

PART D: IDENTIFYING THE POPULATION

This section discusses various groups of people who might respond to a task survey. Criteria are listed that might help guide you in selecting your population and examples are provided for specific situations.

PERFORMANCE OBJECTIVE:

After reading this section, the workshop participants will select and describe appropriate populations for proposed surveys.

RESOURCES:

Reading: pp. 1 - 2 "Identifying the Population"
Activity: pg. 3
Feedback: pg. 4

✓

Identifying the Population

Employers and employees generally constitute the population of subjects to which a task survey is directed. Each group must be identified on the basis of their importance to specific curriculum development needs. The population from which a future sample will be selected must be accurately identified in order to collect usable data. There are several situations which will determine whether or not to include any group of employers or employees in the survey population. Several of the criterion questions to consider are:

> As a group, do certain businesses hire a majority of the vocational graduates in your school?
>
> Do certain businesses constitute a growing job market for which a vocational program is to be developed?
>
> Are certain employers in a rapidly changing technology that will cause present courses to need frequent revisions to remain current?
>
> Do the employers in a given occupation require new instruction and/or advancement training which will be provided through your adult education programs?
>
> Does a certain group or cluster of occupations offer various job opportunities for which there is a need to determine the common and unique tasks across the several jobs?
>
> Do you desire follow up information on graduates that can indicate the training they received in school is being used on their jobs?

If you answer yes to one or more of the questions then that particular group of employers or employees should be identified and included in the intended survey population. Population selection is dependent on the particular questions you intend to ask and also on the basic curriculum needs being considered. New course development requires information from both the employers and employees in certain industries while course revision might require information from employees, supervisors and course graduates. The population that is identified will vary as to type and level of workers, as the nature and location of the occupation changes. For example, if most jobs available to graduates are in an institutional setting such as cafeteria food services, hospitals, clinics, large offices, or large factories, the second line supervisors might be more appropriate for obtaining task information usable in curriculum development than the top managers, employers or owners.

Groups of people other than employers or employees in the business or industries providing job openings may also be an important group to identify for gathering task data. Modified task survey information could be gathered from the equipment manufacturers for those industries where worker performance is closely related to the equipment design. The population of equipment manufacturers might be a small or large group and may be local or distributed across the entire country. Data from such a group concerning design changes and new skills required can provide advanced information on changes in task performance. Such information would allow early planning for course changes as well as budget consideration for acquiring new equipment. Basically a survey would need to identify those tasks highly dependent on equipment design or function and solicit a response from engineers and sales representatives on the degree of performance change in each task. Specific training information could be acquired and introduced in the course as local industry moves toward adopting the new equipment. This example has been presented primarily to depict an alternative type of population to be selected for a survey. The practicality of using a survey to monitor equipment change would have to be considered in light of such factors as the nature of the equipment, the probability that potential local employers would purchase the new equipment, the probability that the school could afford to acquire new equipment for training and the degree to which specific training might be provided on the job.

In summary, the identification of the population of subjects to be studied is not a simple decision but requires that many factors be considered before any group is casually included or excluded.

those industries where worker performance is closely related to the equipment design. The population of equipment manufacturers might be a small or large group and may be local or distributed across the entire country. Data from such a group concerning design changes and new skills required can provide advanced information on changes in task performance. Such information would allow early planning for course changes as well as budget consideration for acquiring new equipment. Basically a survey would need to identify those tasks highly dependent on equipment design or function and solicit a response from engineers and sales representatives on the degree of performance change in each task. Specific training information could be acquired and introduced in the course as local industry moves toward adopting the new equipment. This example has been presented primarily to depict an alternative type of population to be selected for a survey. The practicality of using a survey to monitor equipment change would have to be considered in light of such factors as the nature of the equipment, the probability that potential local employers would purchase the new equipment, the probability that the school could afford to acquire new equipment for training and the degree to which specific training might be provided on the job.

In summary, the identification of the population of subjects to be studied is not a simple decision but requires that many factors be considered before any group is casually included or excluded.

✓

ACTIVITY: Read the following survey descriptions and indicate who would be the best respondents.

1. You are developing a new course for your geographic area. You want to find out the relative amount of time spent on each task, how soon after employment task competency is expected, and how many workers perform the task.

2. You are updating and revising your course to meet the occupational demands in your area for competent entry level workers.

3. You course occupational cluster has undergone a sudden and drastic change in technology. You want to know how this is going to effect the use of current equipment. How soon these changes will be phased in at local levels. Will the present workers need supplemental training?

4. You wish to find out if your students are using the training they received in school in their present occupations.

FEEDBACK:

Survey 1:	Entry level workers, advanced level workers, and/or employers
Survey 2:	Entry level workers, and/or employers
Survey 3:	Local industry employers, engineers, manufacturers, and/or professional societies
Survey 4:	Graduates

FEEDBACK:

Survey 1: Entry level workers, advanced level workers, and/or employers

Survey 2: Entry level workers, and/or employers

Survey 3: Local industry employers, engineers, manufacturers, and/or professional societies

Survey 4: Graduates

PART E: SELECT THE SAMPLE SIZE*

This section gives you a detailed step by step procedure on how to correctly determine sample size for a representative sample. Examples and tables are provided.

PERFORMANCE OBJECTIVE:

After reading this section, the workshop participants will follow the procedures given and use the tables provided to determine the proper sample size for different survey situations.

RESOURCES:

Reading: pp. 1 - 3 "Selecting the Sample Size"
Activity: pg. 4
Feedback: pg. 5

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*Information and tables for this section were derived from "The Sampling Problem in Research Design" by Dr. J. Robert Warmbrod, The Agricultural Education Magazine, November, 1965.

Selecting the Sample Size

One of the critical decisions in conducting survey research is determining the number of subjects in the population to be surveyed to insure a representative sample. The following information is provided as a brief and simple set of guidelines on how to select the appropriate size sample for the survey needs.

First, the population to be studied and the number of subjects in the population must be identified, then the following questions must be answered before selecting the size sample to be drawn.

1. How accurate do you wish your sample estimate to be or what margin of error will you accept? There is always some margin of error in all estimates made from sample data.
2. What amount of risk are you willing to accept that your sample estimate may exceed your selected margin of error? There is also some risk that you will draw a bad sample.
3. What percentage of the subjects in the population would you estimate to fall in the category of interest you are studying? You must make an educated guess as to the largest percentage of subjects which will be in the special category or group you want to know about.

The following example illustrates the procedure for answering these three questions and the subsequent steps to follow in selecting a sample size.

Assume that you wish to collect information about the type of work done by nurse assistants in hospitals, clinics, and private clinics. To do this you need to draw a sample that will be large enough to allow estimates to be made about the total population.

You have determined that there are 1000 nurse assistants working in the geographic area being studied. Now the three essential questions must be answered.

1. How accurate do you wish your sample estimate to be or what margin of error will be accepted?

   You decide to accept a sample estimate that is within 5 percent of the true measure. That means if the sample estimate indicates 30 percent you can be sure that the true value of the measure is between 25 and 35 percent of the population.
2. What amount of risk that the sample estimate may exceed the selected 5 percent margin of error are you willing to take?

You decide to take a chance of 1 in 20 that the sample may be a bad sample. In other words, you wish to be 95 percent confident that the sample will not exceed the 5 percent margin of error.

3. What percentage of the population of subjects do you estimate to be in the category of interest?

Since you are concerned with three categories or "types of employment sites" you must estimate the largest percentage in any one type. You estimate that not more than 40 percent of the nurse assistants work in any one of the three type agencies, (hospitals, clinics, and private offices.)

You now have answered the three necessary questions and are ready to select the sample size. Recall that the three conditions are:

"desire a 5 percent margin of error for the sample data"

"will take 1 chance in 20 of a bad sample"

"estimate 40 percent in category of interest"

The next step is to go to the table provided and determine the sample size necessary. To use the table, read down the column at the left (Number of Sampling Units in Population) and locate the size of the population being studied. (1000 nurse assistants).

Number of Sampling Units in Population	If willing to take a risk of 1 in 20 that actual error is larger than five percent and the estimated percentage of the population in the smaller category is:					If willing to take a risk of 1 in 10 that actual error is larger than five percent and the estimated percentage of the population in the smaller category is:				
	10	20	30	40	50	10	20	30	40	50
100	59	72	77	79	80	51	65	71	73	74
200	84	112	125	132	133	68	96	110	116	118
400	106	156	183	196	200	83	126	151	164	168
600	116	179	215	234	240	89	141	173	189	195
800	122	194	237	259	267	92	150	186	206	212
1000	126	204	251	277	286	94	156	195	217	224
1500	131	219	275	306	316	97	165	209	234	242
2000	134	227	288	322	333	99	169	217	143	252
2500	136	232	296	333	345	100	172	222	249	259

*If population is less than 100, survey the total population.

Next read across the first row to locate the percent of subjects estimated to be in the category of interest, (not more than 40 percent in any one type of site.) Now read down the column under the 40% heading until intersecting the 1000 population level. The number 277 indicated is the size sample that should be surveyed to obtain the desired level of accuracy. You must obtain 277 responses to meet the levels of error selected.

A larger sample size decreases the margin of error for your sample. A smaller sample size increases the margin of errors as well as increasing the chances of getting a bad sample. If your returns are less than the selected sample size your sample accuracy is decreased.

In summary, follow this procedure for selecting a sample size:

1. Determine who the subjects are in the population to be studied.
2. Determine the number of subjects in the population.
3. Obtain a list of all the subjects that do not have deletions or duplications
4. Establish the amount of error accepted. (5%, 10%, 15%, etc.)
5. Determine the risk taken of drawing a sample that exceeds the selected margin of error. (1 in 20; 1 in 10)
6. Estimate the largest percentage of the population expected to be in the category of interest. (20 to 30 percent, 30 to 40 percent, etc.)
7. Go to the table provided and determine the sample size by finding the intersection of the population column and the percent of interest row. That number is the number of responses needed to collect representative data within the margins established.

ACTIVITY: Supply the missing information according to the seven steps listed on page 3.

1. You are going to survey small appliance repair people that work in three different types of agencies. You have a list of all 823 workers in your job placement area. You want an error of no more than 5% and will take a 1 in 20 chance of drawing a bad sample. You estimate no more than 40% of the workers are employed in any one type of agency. How many responses do you have to collect to be certain of a representative sample?

2. You are going to survey 517 people who are employed in plant nurseries in a three county area. You estimate that no more than 20% are in clerical or administrative positions. You want an error of no more than 5% in your sample. Decide what risk you will take that your sample is unrepresentative and determine the number of responses you need.

3. You wish to do a follow-up study of graduates to determine how many are working in jobs for which they are trained and of those that are, what tasks they perform. You have a list of all 765 graduates from your school in the past three years. Estimate the percentage in the category of interest (working in jobs for which they were trained), establish the amount of error you will accept, the degree of risk you will accept, and determine your sample size.

FEEDBACK:

1. You should collect the responses of 259 people to be sure of a representative sample.

2. If you decided on a risk of 1 in 20 you should collect the responses of 179 people.

   If you decided on a risk of 1 in 10 you should collect the responses of 126 people.

3. There is no one correct answer. The number of people will vary according to the percentage you estimate are in the category of interest and the amount of risk you are willing to accept.

PART F: SELECTING SAMPLING METHODS

This section discusses population characteristics that dictate the method of sampling you chose. It discusses the methods, advantages, and disadvantages of simple random sampling, cluster sampling, proportional stratified sampling, and disproportional stratified sampling.

PERFORMANCE OBJECTIVE:

After reading this section the workshop participants will select an appropriate sampling method for given population characteristics.

RESOURCES:

Reading: pp. 1–5 "Drawing a Representative Sample"
Activity: pg. 6
Feedback: pg. 7

Drawing a Representative Sample

The sample of subjects selected will be the potential respondents to a survey. Because a good sample should represent the normal distribution of important characteristics in the whole population, the methods of selecting a sample and the size of the sample chosen are not to be determined casually. In order to draw valid conclusions from the responses obtained on a task survey the sample should be as representative of the whole population as possible. A sample drawn from most convenient lists of names or the most convenient group of people may give information that differs considerably from the rest of the population. There are several techniques for selecting a sample that has a good chance of being representative of the total population. The techniques discussed here are simple random sampling, stratified random sampling and cluster sampling.

Before selecting a means of drawing a sample it is essential to look at the important characteristics of the population being studied. The population characteristics are homogeneous, (evenly distributed) when the following conditions exist.

The subjects in the population work in a single occupation
The subjects in the population work in one type of agency
The subjects in the population use one type of skill
The population is found in one location
The agencies offer jobs with equal placement opportunities for graduates

In such cases a simple random sample can be drawn.

Random sample selection, sometimes referred to as representative or proportional sampling, involves methods of selection which allow each unit or subject in the population an equal chance of being selected. Some common techniques for drawing a random sample are:

1. Write all the names of the population subjects on separate pieces of paper, place them in a container, mix them up and draw out the prescribed number of names. As each name is drawn and recorded, it must be placed back in the container with the other names before drawing another name.
2. Give each subject on the list a number, and go to a table of random numbers (found in back of the basic statistic text books). Start anywhere in the tables. Read consecutive numbers in any direction and select those subjects whose numbers correspond with those found in the tables.

Example: Assume you wish to survey nurse assistants who work in hospitals in your job placement area. You are concerned with one occupation (nurse assistant), one type of agency (hospitals) and one location (local area.) First obtain a list of all the nurse assistants employed in the local hospitals. Next, assign each assistant a number. Use a table of random numbers to select the size sample wanted.

The advantages of simple random sampling are in the elimination of bias in sample selection, the representativeness of the sample, ease of accessing sampling errors based on laws of chance and the way it reveals the variability of the population. The disadvantages include the necessity of obtaining a complete list of cases in the population, and the possibility of drawing a poor sample.

Cluster sampling is another form of random sampling. It is used when the proposed population is too large to make it feasible to obtain the names of each possible case for the sample. Cluster sampling reduces the number of cases the sample is drawn from by randomly selecting from a hierarchy of classifications.

Example: Assume you wish to sample the population of nurse assistants in the state. The number of nurse assistants in the proposed survey area is much too large to work with. Follow these steps to reduce the number of cases from which to draw a sample:

1. Divide the survey area into smaller geographic regions (county - cities - townships - voting districts, etc.) and draw a random sample of regions.
2. From each of these regions draw a random sample of hospitals
3. From each of these hospitals draw a random sample of wards
4. Obtain the names of the nurse assistants employed in these wards and draw a random sample of names for your survey.

The more steps you go through in cluster sampling, the larger the possibility of losing the representativeness of the population with the sample drawn.

Stratified Sampling

Many times the population characteristics are not homogeneous, such as in any of the following cases:

The subjects work in a cluster of related jobs
The subjects use a variety of skills in their jobs
The subjects are employed in different types of agencies
The subjects are found in different locations
The agencies involved offer unequal placement opportunities for graduates

In these cases select a stratified sample. This means of sample selection allows you to classify the population into two or more strata or classes and then draw a sample from each stratum.

Example: Assume you wish to survey nurse assistants to identify the different and/or common skills required for different agencies in different geographic areas. In this case you are concerned with different agencies (hospitals, clinics, doctor's offices, etc.), different geographic regions (possibly urban vs. rural) and the variety of skills used in these different circumstances. First compile a list of nurse assistants who work in each of the identified agencies and stratify the list of names according to the agency type. Then proceed to draw the desired sample from each strata list. There are two types of samples that can be drawn in stratified sampling; proportional samples and disproportional samples.

In proportional stratified sampling the number of cases drawn from each stratum is in the same proportion to the total sample as the number of cases in the stratum is to the total population as can be seen in Figure 2. Stratum A has 500 cases or one half the population of 1000. The sample drawn from Stratum A is 250 or one half the stratum size. The same follows for Stratum B and Stratum C.

Proportional Startified Sample

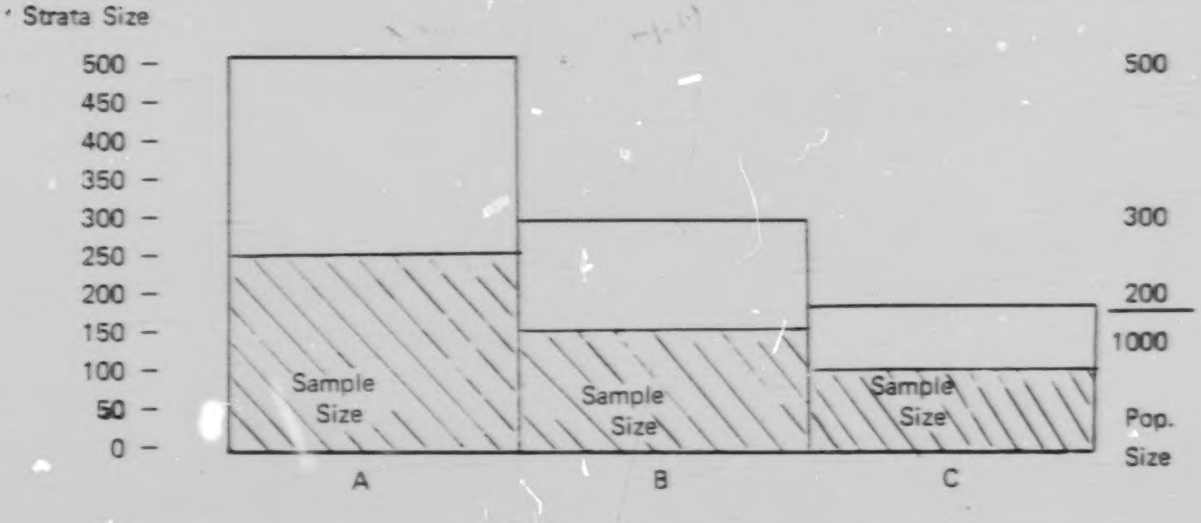


Figure 2

One advantage to proportional stratified sampling over simple random sampling is that it eliminates the chance that a stratum with only a few cases will be completely unrepresented. An easy way to draw a proportional stratified sample is first decide what proportion of the population is to be sampled and second, randomly select the number of cases that represent that proportion of each stratum.

Example

You wish to survey 20 percent of a population of 500 nurse assistants for a total sample size of 100 cases. The nurse assistants are stratified in the following manner:

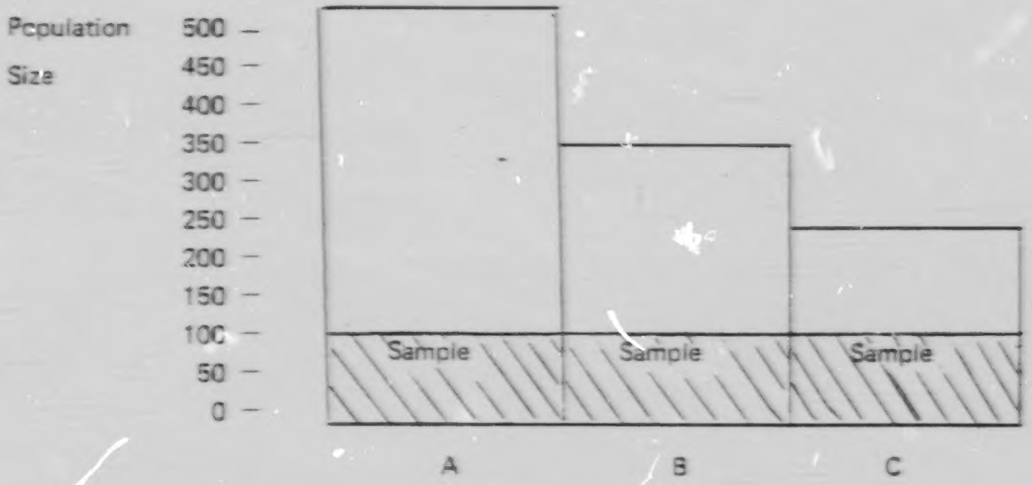
Stratum A. Nurse assistants who work in hospitals = 300 (300/500 = 60% of the population)
Stratum B. Nurse assistants who work in clinics = 175 (175/500 = 35% of the population)
Stratum C. Nurse assistants who work in doctor's offices = 25 (25/500 = 5% of the population)
Population Total = 500

To determine the number of cases to be selected randomly from each stratum, take 20 percent of the total number of cases in each stratum. (Formula: percent of population to be included in the total sample times the number of cases in a stratum = number of cases to be drawn from that stratum.)

Stratum A. 20% of 300 = 60 cases (60/100 = 60% of the sample size)
Stratum B. 20% of 175 = 35 cases (35/100 = 35% of the sample size)
Stratum C. 20% of 25 = 5 cases (5/100 = 5% of the sample size)
Total sample size = 100

A quick check will show that the number of cases randomly selected from each stratum is in the same proportion to the stratum as the stratum is to the population. In drawing a disproportional stratified sampling (also called controlled sampling) an equal number of cases is drawn from each stratum regardless of what proportion the stratum makes up of the population. See Figure 3.

Disproportional Stratified Sample



Strata

Figure 3

One advantage of this method is that it facilitates comparisons between the different strata. It is also economical in that it does not require securing a large number of responses from the larger groups in the population. A disadvantage can be finding an equal number of qualified cases in the smaller strata. The attainment of an equal number of cases per stratum may be hard to achieve. Anything less would necessitate the weighting of the responses to equalize their value as illustrated in the following example.

Assume you wish to draw 50 cases from each of three agencies employing nurse assistants to make up a sample size of 150 cases. It is possible to locate only 25 nurse assistants working in doctors' offices. It would be necessary to give those cases twice the value of the others (count each response twice) in the total group tally to make up for the lack of numbers.

In summary, the selection of sampling techniques depends first on the characteristics of the population and the availability of the cases in the population. Use a simple random sample if the population characteristics are homogeneous. Use a stratified random sample if the population characteristics are not homogeneous and the survey explores several groups that can be stratified according to important differences. The population size and availability will determine whether to choose cluster or simple random selection. Proportional stratified samples may be drawn when stratum size is an important characteristic for interpreting the data. If basic information is desired and stratum size does not effect the use of the data, use disproportional samples.

ACTIVITY:

1. Match the population characteristics to appropriate sampling methods.

Population Characteristics

1. _____ 215 greenskeepers for golf courses in your geographic area of concern.
2. _____ Over 10,000 dental assistants located throughout the state
3. _____ Auto repair persons working in the local area, in 3 types of agencies
4. _____ 20 graduates from each program in your school
5. _____ 560 employees of bakeries listed in census data
6. _____ 5,000 insurance salespersons throughout the state
7. _____ Secretaries working in specialized professional offices (medical, dental, legal, etc.)

Sampling Methods

A. Cluster sampling
B. Disproportional Stratified
C. Proportional Stratified
D. Simple Random

2. You are going to survey 1000 Clinical Medical Assistants. Develop a strategy for cluster sampling;

3. You know that 500 of the Clinical Medical Assistants work in general practice offices, 250 work in family practice offices, 150 work in internal medicine offices, and 100 work in obstetrics and gynecology. You wish to draw a proportional stratified sample of 30 percent of the population. How many people would you chose from each category?

FEEDBACK:

1. Population 1 : d

   Population 2 : a or d

   Population 3 : c

   Population 4 : b

   Population 5 : d

   Population 6 : a or d

   Population 7 : c

2. Divide the state into counties. Draw a random sample of counties. Obtain lists of health facilities that employ medical assistants. Draw a random sample of facilities. Obtain a list of medical assistants from those facilities. Draw a random sample from that list.

3. 30% of 500 = 150 from general practice

   30% of 250 = 75 from family practice

   30% of 150 = 45 from internal medicine

   30% of 100 = 30 from obstetrics and gynecology

PART G: DEVELOPING THE SURVEY PACKET

This section introduces you to the mechanics of developing the survey packet. Explanations of, and examples of cover letters, instruction sheets, background information sheets, and follow-up letters are presented, as well as discussions on tokens and endorsements.

PERFORMANCE OBJECTIVE:

After reading this section, the workshop participants will identify the components of a survey packet, and list the important characteristics of the components.

RESOURCES:

Reading:	pp. 1-4	"Developing the Survey Packet"
	pp. 5-9	"Appendices C, D, E, and F"
Activity:	pg. 10	
Feedback:	pg. 11	

Developing the Survey Packet

The contents of a task survey packet will generally include a cover letter, instruction sheet, a background information sheet, a task inventory (developed in phase I), a mailing envelope, a return envelope, and an optional gift or token. A follow-up letter is an important part of the survey process, but will not be included in the original survey packet. After selecting the tasks and questions to be used on the inventory, all of the survey components must be designed and printed. Each component will be reviewed in the following sections.

Cover Letter

The cover letter should introduce the school organization and explain the purpose of the survey to a prospective respondent. The impression made by the cover letter may determine whether or not the reader responds to the survey, so the contents and format should be well thought out. Preliminary drafts of the cover letter should be submitted for review to several people who represent the groups to be surveyed. They should check the first draft for content, style, and clarity before developing the final draft. Generally, the cover letter should explain:

The purpose of the survey and contents of the packet.
The reasons why the reader has been selected as a respondent.
The importance of the individual's response to the survey.
The deadline for responding.
An expression of appreciation for their assistance.

When surveying people who belong to a recognized organization, a letter of endorsement from the organization included with the cover letter will generally increase the number of returns. Advisory committee members may be able to assist in gaining an endorsement from various related organizations. Examples of cover letters can be found in Appendix C.

Instruction Sheet

Clear and concise instructions to the respondent on how he/she is to fill out the survey instrument are essential to a successful survey. The instructions must be understood by the survey respondents in order for them to provide accurate responses. The instructions should be printed on a separate sheet. The use of examples and illustrations should be used to increase the clarity of the instruction. Make the answering process as simple as possible and thereby, simplify the instructions. By performing a self-answering procedure and recording each step, you can produce a detailed list of instructions for the first draft. The detailed steps can then be combined into instructional statements. It might help to carefully read each of the written instructions and underline the key terms in each. Be sure to explain any words or phrases which have special meaning in the survey instructions.

Test the instructions and explanations by having several people who are not familiar with the material try to complete the survey forms. If they fail to do so correctly, carefully question them to determine what is confusing in the instructions and revise accordingly. The responses to the survey questions should generally take the form of rating scales with words or phrases identifying the relationship between the different points on the scale. Provide a clear definition for each word or phrase used on the scale. The use of words such as "few - some - many" or "poor - fair - good" will make it difficult for the respondent to determine what is meant by the terms and consequently will leave questions as to the proper interpretations of the response. A complete explanation and example of the meaning of each word or phrase should be provided along with the instructions. Assigning numerical values to answers can aid the respondent in judging his/her most appropriate answer. Use numbers to indicate different values assigned to different responses on the answer scale. This should aid the respondent in determining the importance of one response over another. Examples of instruction sheets are in Appendix D.

Background Information Sheet

The background information sheet should be designed to collect relevant information from the survey respondents. Only important and useful information which will help in making curriculum decisions should be requested. Requests for extensive information tends to discourage response. The background information which can assist in interpreting the task data will include the following information from the respondents:

Job title
Job location
Type of business where employed
Number of years in the occupation
Number of years in the present job
Education and training background
Where occupational training was received

By collecting the suggested background information from the respondent, the following information can be determined:

What are the different job titles used in an occupation?
Which tasks are common and which are unique to the various job titles?
How often do workers change jobs in an occupation?
How long do workers remain in the occupation?
Which tasks are performed in different types of agencies?
Which tasks are most frequently performed by workers with different amounts of job experience?
How does education differ among workers and how does task performance relate to education?
What type of training have the respondents received and where did they receive it?

In order to simplify the collection and the tabulation of background information, use multiple choice type responses. Avoid the use of open-ended questions as they discourage response and are difficult to summarize when they are answered. Examples of background information sheets can be found in Appendix E.

If automatic data processing forms will be used, consult the equipment operation representative and discuss the most efficient and economical response forms to use. Local schools with data processing programs should consider the possibility of using their own equipment to tabulate results. Automatic equipment is not essential to the survey process but it does provide a means for treating the data to a greater number of analysis techniques. Once the background information sheet is designed, it should be tested with several representative respondents to determine if the instructions are clear and the format is readable and easy to follow.

The Return Envelope

To insure a higher return on the survey, provide a stamped, self-addressed return envelope in the survey package. Postage will be increased somewhat, but it is logical to do so. Since a given amount of money, time, and effort has been invested in developing the survey and mailing it out, any non-returns constitute a total loss; therefore, if a marginal postage cost increase can increase the number of returns the total survey cost – recovery ratio is improved.

Number or code envelopes (or surveys) in some manner to determine who has responded. Those not responding can then be sent a follow-up letter to encourage them to complete the survey. By using a code system, there is some chance that individuals will not respond because of suspicions about the use of the identification code. If a code system is used, it should be disclosed, explained, and a statement of confidential use included on the background information sheet or the cover letter to assure the respondent of the privacy of his/her return.

Tokens

A token can be any item which is included in the survey, such as a small pencil, ruler, plastic calendar, sports schedule, or ticket or coupon having an exchange value. The inclusion of a token with the survey instrument is optional. Tokens or gifts have questionable usefulness in greatly increasing the number of returns. However, while they may cause only a small increase in the total returns, they may serve a valuable public relations or publicity purpose which would justify their cost.

Survey Follow-up Letters

Survey follow-up letters are not part of the survey packet that is originally mailed to the survey sample. Their purpose is to increase the number of returns by reminding non-respondents about the survey and requesting that they return it. Follow-up letters can be designed at the same time the rest of the survey materials are developed or at a later date. A survey follow-up contact may take the form of a post card or letter, and should include:

A reminder to the non-respondent that they were mailed a survey
A request that the non-respondent fill out the survey and return it
A tactful acknowledgment that the survey may already be in the mail, in which case, the respondent should ignore the reminder
A statement of appreciation for their assistance

Examples of follow-up letters are in Appendix F. Follow-up letters should be brief, to the point, and courteous. They can be just a reminder or possibly include a second survey instrument.

APPENDIX C : SAMPLE COVER LETTER

APPENDIX D: SAMPLE INSTRUCTION SHEET

APPENDIX E: SAMPLE BACKGROUND INFORMATION SHEET

APPENDIX F: SAMPLE FOLLOW-UP LETTER

.IML INSTRUCTIONAL MATERIALS LABORATORY
TRADE AND INDUSTRIAL EDUCATION
THE OHIO STATE UNIVERSITY, 1885 NEIL AVENUE, COLUMBUS, OHIO 43210 | TELEPHONE 614 · 422-5001

Dear Dr.

The Vocational Instructional Materials Laboratory is conducting a study that we believe you will find helpful to your profession. We are involved in developing new instructional materials in the career field of Medical Assisting. The information from this study will be used to revise existing Medical Assisting programs in order to improve the quality of training programs being offered to students in your area.

We need your valuable input as a doctor-employer to make sure the skills taught to students in secondary vocational programs will meet the needs of their employers. Please take a little of your time and complete this questionnaire and the brief background information sheet. The background information sheet is designed to tell us what type of assistants are employed in various types of offices in various areas. The questionnaire asks you to respond to two questions for every task performed in your office. The first question asks how precisely a task must be performed to meet established standards. The second question asks how proficient you would want a recent graduate from a secondary vocational program in medical assisting to be in performing each task.

Your participation is vitally essential to this project and your generous assistance is appreciated. Please use the self-addressed, stamped envelope to return the completed questionnaire by May 16, 1975. Your prompt response will insure the inclusion of your opinions in our study. Thank you for your professional attitude and assistance.

Sincerely,

Faith L. Justice

Faith L. Justice
Research Associate

SURVEY INSTRUCTIONS

We are concerned with designing curriculum to provide graduates from vocational programs with adequate entry-level skills in the career field of Medical Assisting. You can help us identify those skills by reading the explanations and following the instructions given below. Please make any written suggestions you feel will help us in our effort.

1. Fill out the Background Information Sheet completely.

2. Read each task statement carefully. Respond only to those tasks which are performed in your office by circling the appropriate number according to the following codes:

   Criticality indicates the tolerance level allowed in the performance of each task without significant loss of time, materials, equipment, patient comfort or safety.

   1. Flexible: Relatively unimportant whether the task is performed in a certain way or not. (Example: Read to a patient*)
   2. Average Criticality: Deviation from prescribed methods could result in minor delays, patient discomfort, or loss of resources. (Example: Administer enema*)
   3. Above Average Criticality: Very little tolerance may be allowed without risk to worker or patient or loss of resources. (Example: Maintain isolation technique*)
   4. Highly Critical: Must be done within strict parameters to avoid irreversible loss of health or expensive equipment. (Example: Administer intravenous medications*)

   Proficiency indicates how proficient a recent graduate of a secondary vocational program should be in performing each task.

   1. Familiar with the task, but not skilled in performing it.
   2. Slightly skilled in performance, can perform under direct supervision, need review and practice.
   3. Moderately skilled in performance, can perform with partial supervision and brief practice.
   4. Highly skilled in performance, can perform without supervision, no practice needed.

3. In the spaces provided at the end of each section, write in and rate any tasks that are performed in your office and are not listed.

*Example taken from results of A Study of Nursing Occupations conducted by U.C.L.A. in 1972.

BACKGROUND INFORMATION SHEET

THIS INFORMATION IS CONFIDENTIAL AND WILL BE USED FOR RESEARCH PURPOSES ONLY. THE INFORMATION WILL BE REPORTED BY GROUP ONLY.

1. Check primary type of agency where you practice:

____Single Practice
____Group Practice
____Clinic
____Hospital

2. Number of doctors in the office__________

3. Medical specialities of office______________________________________

4. Number of assistants you supervise________

5. Number of assistants in the office by job title:

____Certified Medical Assistant
____Medical Assistant–Clinical
____Medical Assistant–Administrative
____Other (specify)______________________________________
____Registered Nurse
____Licensed Practical Nurse
____Medical Technologist

6. Do you provide on the job training for untrained Medical Assistants?
Yes____ No____

7. County of practice______________________________________

8. I do not employ medical assistants__________________________

9. I do not wish to respond to this survey______________________

10. Comments:

G-9

IML INSTRUCTIONAL MATERIALS LABORATORY
TRADE AND INDUSTRIAL EDUCATION
THE OHIO STATE UNIVERSITY, 1885 NEIL AVENUE, COLUMBUS, OHIO 43210 | TELEPHONE 614 · 422-5001

May 19, 1975

Dear Dr.

I recently mailed to you a survey concerning tasks done by Medical Assistants. I asked that it be returned by May 16, 1975. If your survey is in the mail, thank you very much for your professional assistance. If you have not returned the survey, please fill it out and return it. If you do not employ assistants or do not wish to respond, please take two minutes of your time to fill out the brief background information sheet, check the appropriate space and return the survey by May 23, 1975.

As I mentioned in the cover letter, this survey is part of a federally funded project. The information will be used in a state-wide curriculum development effort in the vocational training of Medical Assistants. The results of this study will be reported to the Ohio Medical Assistants Association and each county medical society that provided us with a directory. If you have any questions as to how this information will be used, please feel free to write or call me at the above address.

Thank you again for your valuable assistance in helping to make this study accurate and representative of the medical profession's opinion.

Sincerely,

Faith L. Justice

Faith L. Justice
Research Associate

ACTIVITY:

1. Circle the correct answer. Choose only one group.

   A task survey packet should include at least the following items:

   a. cover letter, instruction sheet, background information sheet, task inventory, token or gift, follow-up letter.

   b. cover letter, instruction sheet, background information sheet, task inventory, token or gift.

   c. cover letter, instruction sheet, background information sheet, task inventory.

   d. cover letter, instruction sheet, background information sheet, endorsement, task inventory.

2. Match the appropriate characteristics and/or functions listed on the right with each component listed on the left.

   A. Cover letter

   B. Instruction sheet

   C. Background information sheet

   D. Task inventory

   E. Return envelope

   F. Token or gift

   G. Follow-up letter

Characteristics

____ increases the number of returns
____ states the purpose of the survey
____ gives examples and illustrations on how to fill out the survey
____ asks for information about respondents occupation
____ lists the task statements
____ is coded
____ serves for good public relations
____ reminds the non-respondents about the survey
____ has a rating scale
____ assists in interpreting the data
____ insures the proper interpretation of the rating scales
____ introduces you and/or your organization
____ contains an expression of appreciation
____ contains a deadline for responding
____ asks for information about the respondents' education and training

FEEDBACK:

1. A task survey packet should include at least the following: (c) cover letter, instruction sheet, background information sheet, and task inventory.

    A gift or token is optional.
    An endorsement is optional.
    A follow-up letter is not a part of the survey packet, but is an important part the survey process.

2. A cover letter

    states the purpose of the survey.
    introduces you and/or your organization.
    contains an expression of appreciation.
    contains a deadline for responding.

   An instruction sheet

    gives examples and illustrations on how to fill out the survey.
    assists in interpreting the data.
    insures the proper interpretation of the rating scales.

   A background information sheet

    asks for information about the respondents occupation.
    is coded.
    assists in interpreting the data.
    asks for information about the respondents' education and training.

   A task inventory

    is coded.
    has a rating scale.
    lists the task statements.

   A return envelope

    increases the number of returns.

   A token or gift

    increases the number of returns.
    serves for good public relations.

   A follow-up letter

    increases the number of returns.
    contains an expression of appreciation.
    contains a deadline for responding.

PART H: DISTRIBUTING AND COLLECTING THE SURVEY

This section discusses the advantages and disadvantages of mail and personal distribution of surveys as well as follow-up techniques.

PEFORMANCE OBJECTIVE:

After reading this section, the workshop participant will correctly identify as "true" or "false" statements about the characteristics of mail surveys, personally distributed surveys, and follow-up contacts.

RESOURCES:

Reading:	pp. 1-2	"Distributing and Collecting the Survey"
Activity:	pg. 3	
Feedback:	pg. 4	

Distributing and Collecting the Survey

Once the survey instrument is developed and sample size is determined, the survey material (cover letter, instructions, background information sheet, and task inventory) can be duplicated in appropriate numbers. It is recommended that the task inventory be printed on colored paper to help increase the returns.

At this time, arrange for sufficient supplies of mailing and return envelopes, postage, and tokens or gifts, to conduct the survey by mail. Mail surveys are the most feasible when surveying large numbers of people, many agencies, and many different locations , or when you have access to workers' names and home addresses. Students or clerical help can type addresses, stamp return addresses, affix sufficient postage to return envelopes, collate all materials, code and mail the survey instruments.

Student or clerical help can also develop a filing system for collecting the returns. If a response code was used, it will be necessary to check off respondents and contact non-respondents. Follow-up contact should be made when the daily returns have dwindled. The rule of thumb is: the more follow-up contacts made, the larger the number of returns. Budget and time restrict the number of follow-up contacts that are practical.

An economical first follow-up contact for a mail survey is a simple post card reminder. After returns have dwindled again, a second reminder in letter form with an additional survey instrument can be mailed. The letter could suggest that the non-respondent might have misplaced the survey or it was lost in the mail and would they please fill out and return the survey instrument provided in this mailing. Two alternatives are a single contact of a letter or card, with no survey, or mailing the letter first with the additional survey following it.

If possible, a telephone follow-up contact can be used. Personal requests usually increase returns. If the non-respondents do not wish to reply for any number of reasons try to obtain some background information to see if the non-respondents as a group differ greatly from the respondents. You can then assess whether the exclusion of their responses from the survey will bias the results and adjust for it.

An alternative to mail survey is personal distribution. This will often yield a higher percentage of returns than a mailed survey, but requires more time and effort. Personal distribution is a good way to survey a small sample and insure good returns. It is also best when sampling a large concentration of workers in a few agencies, or if the names of the agencies are available, but you cannot obtain the names and addresses of workers for a direct mail survey. Personal contact also has the advantage of being good for public relations. The individual or an advisory committee member can make the initial contact with the employer or supervisor, explain the purpose and process of the survey, obtain permission to survey the workers, and arrange for a time to deliver the surveys [illegible] time to collect them.

ACTIVITY:

Mark each statement true or false:

__________ 1. A task inventory printed on colored paper increases the returns.

__________ 2. Mail surveys are most feasible when surveying large numbers of people.

__________ 3. Mail surveys are most feasible when you do not have the names of the respondents.

__________ 4. Response codes enable you to follow up non-respondents.

__________ 5. The fewer times you bother people with follow-ups, the more response you will receive.

__________ 6. A follow-up contact can be a post card.

__________ 7. A follow-up contact can be a letter.

__________ 8. Personal distribution is more efficient for a small sample.

__________ 9. A follow-up contact should not include another survey.

__________ 10. Personal distributions are more efficient for workers scattered throughout many agencies.

__________ 11. A follow-up contact can be a phone call.

FEEDBACK:

1. true
2. true
3. false, it is more difficult to reach the worker through a business address.
4. true
5. false, the more follow-ups made, the higher the rate of returns.
6. true
7. true
8. true
9. false, including a second survey often increases the returns.
10. false, that would entail unnecessary work.
11. true

TASK SURVEY

PART I

PART I: CALCULATING SUMMARY STATISTICS

This section discusses compiling and treating the data. Simple tabulation methods are discussed and examples of tally sheets shown. Step by step procedures are given for figuring the percentage of workers who perform the task and a relative mean value for a task.

PERFORMANCE OBJECTIVE:

After reading this section, the workshop participants will calculate the correct percent of workers performing three given tasks and calculate the correct relative mean value for two given tasks from sample data.

RESOURCES:

Reading:	pp. 1-2	"Compiling the Data"
	pp. 2-5	"Calculating Simple Statistics"
Activity:	pg. 6	
Feedback:	pg. 7	

Compiling the Data

After all the surveys are collected, the next step in the task survey process involves tabulating and compiling the responses and performing any appropriate calculations. You must first design a tally sheet for the background information and one for the task data. A tally sheet should be ruled in rows and columns. This facilitates using it for summarizing the data collected. Student or clerical help can tabulate the responses as they come in or tally the total response at the conclusion of the collection period.

A simple way to tabulate the background information is to list the questions or codes for the questions down the left column or a wide sheet of paper. As each response comes in, record the information in the appropriate row. This allows you to look at the responses at the end of the collection period and see if any differences exist between those people who responded early or late. Averages, ranges, and standard deviations can be figured for the total responses at the conclusion of the collection period. See Figure 4.

	June 20				June 21					
(1) Yrs. in Position	3	5	15	1	4	9	10	11	2	8
(2) Yrs. in Occupation	10	15	15	1	8	13	25	18	2	12
(3) Age	30	32	31	19	29	32	43	37	20	31
(4) Sex M		✓	✓		✓	✓		✓		✓
(5) Sex F	✓			✓			✓		✓	

Figure 4
Sample Tally Sheet for Background Data

The tally sheet for the task data should have the task numbers or codes listed in the left column and a column allowed for each possible response to each question asked on the task inventory. See Figure 5.

You may wish to add extra columns on the tally sheet to facilitate recording the data totals, such as an extra column for the relative means for each task and/or the percentage of respondents who indicated they perform that task.

	Frequency of Performance					Statistics	
Task Number	Never	Once a month or less	Once a week or several times a month	Once a day or several times a week	Several times a day	Percent of workers who perform task	Relative mean
	0	1	2	3	4		
1	5	11	20	30	34	95	2.77
2	1	3	14	37	45	99	3.22
3	20	31	42	7	0	80	1.36
4	2	3	5	15	75	98	3.58

Figure 5

Sample Tally Sheet for Task Data N=100

Calculating Simple Statistics

When the group tallies have been completed, it is easy to perform some simple calculations using a hand calculator. Again, student or clerical aids could perform these functions. One measure to examine is the percentage of respondents who actually perform the task. The total number of respondents who indicated they perform a task at some time is divided by the total number of respondents.

Example: Look at the data in Figure 5 for Task 1. To calculate the percentage of workers who perform task 1:

1. Add the numbers in each response column for that task that indicates performance.*

Response column	Numbers	
Once a month or less	11	
Once a week.	20	
Once a day	30	
Several times a day	34	
	95	Total number of workers who indicated they perform the task at some time.

---

*The number of responses in the "never" column would not be included in this total.

2. Divide that sum by the total number of respondents.

95 = Total number of workers who indicated they perform the task.

100 = N total number of respondents

$\frac{95}{100}$ = 95 percent of the workers perform the task at some time.

Another useful measure is the relative mean value for each task for each question. Calculating a mean value produces a numerical average which can reflect the relative frequency, criticality or importance of each task to all the other tasks. Numerical data about the task can provide a mean value that will indicate the relative position of that task with all other tasks according to the question asked. To derive a relative mean value for one task, follow this procedure.

1. Assign a numerical value to each possible response for the question.
2. Multiply the number of responses in each column for one task, times the numerical value assigned to that column.
3. Add the products obtained in step 2.
4. Divide the sum of the products (obtained in step 3) by the total number of responses for the question.
5. Repeat this procedure for each task.

The relative mean should always be greater than or equal to the lowest value and be less than or equal to the highest value assigned to the columns for each question. The mean value allows ranking and reordering of the tasks according to a single number. It also allows comparison of how a task ranks across several questions. This will help with analyzing the data and drawing conclusions.

EXAMPLE: The question asked of the workers in this example is "How often do you perform this task?" The workers responded to one of five possible answers. Never, once a month or less, once a week or several times a month, once a day or several times a week, several times a day.

According to the data reported for Task 1 in Figure 5, each response column was assigned a numerical value: 0, 1, 2, 3, 4, respectively. Next (step 2) the number of responses in each column for Task 1 was multiplied times the numerical value assigned to that column:

No. of responses per column	X	Column value	=	Product
5		0		0
11		1		11
20		2		40
30		3		90
34		4		136
Total no. of responses = 100		Sum of the Products =		277

From these calculations, you can see that the sum of the products for Task 1 is 277, (step 3) and the total number of responses for that task is 100. To derive the final number that will give you the relative mean, divide the sum of products by the total number of responses. (Step 4)

$$\frac{277}{100} = 2.77$$ relative mean for Task 1 for the question on frequency of performance.

It is very important in analyzing data to divide the sum obtained in Step 3 by the total number of respondents and not just the number of respondents that indicated they performed the task. Dividing by the total will give a relative mean value for each task for a defined group (all of the respondents). If the sum is divided by only the number of respondents who indicated they performed the task, you have no way of putting the tasks in relation to one another. For example, after calculations, two tasks may have very similar mean values, but one is performed by 95 percent of the workers, and the second is performed by 15 percent of the workers. This discrepancy would have great effect on the analysis and conclusions.

These operations (percent of workers, and relative mean value) can be performed on any group of the data. You may wish to look at the entire group or subgroups of the respondents. The inventories can easily be regrouped according to specific questions of interest. You may wish to look at the data as reported by respondents with:

different job titles
different numbers of years of experience
different training
vocational school education
varying salary ranges
experience in different types of agencies

Any question asked on the background information will allow regrouping the inventories and retallying the results to compare the groups for differences and similarities. Record the data for the subgroups first, and then total the results for the entire group. If access to a data processing system is available, it may allow many comparisons that would be unfeasible by hand. Some systems will also regroup the data after it has been entered. Consult with the systems operators to ascertain the form the data must be in for processing.

ACTIVITY:

1. Calculate the percent of workers performing tasks number 1, 2, and 4.

   (Formula: percentage = number of workers who perform the task at some time divided by the total number of respondents.)

2. Calculate the relative mean value for performance for tasks number 3 and 5.

SAMPLE DATA

N = 100

Task	Never	Monthly. . .	Weekly. . .	Daily. . .	Several. . .
1	53	38	7	2	0
2	11	18	25	34	12
3	2	9	18	29	42
4	10	17	38	21	14
5	18	24	30	21	7

FEEDBACK:

1. Task 1

38
7
2
47 divided by 100 = 47%

Task 2

18
25
34
12
89 divided by 100 = 89%

Task 4

17
38
21
14
90 divided by 100 = 90%

2. Task 3

2 x 0 = 0
9 x 1 = 9
18 x 2 = 36
29 x 3 = 87
42 x 4 = 168
300 divided by 100 = 3.00

Task 4

18 x 0 = 0
24 x 1 = 24
30 x 2 = 60
21 x 3 = 63
7 x 4 = 28
175 divided by 100 = 1.75

PART J: INTERPRETING THE DATA

This section discusses different strategies and rationales for analyzing and interpreting the data according to the percentage of workers performing the tasks and the relative mean value of the tasks for any question asked.

PERFORMANCE OBJECTIVE:

After reading this section, the workshop participants will rank a set of sample tasks according to a minimum criteria given for percentage of workers performing the task and relative mean value for frequency and criticality. The workshop participants will analyze the sample ranking for inclusion in instruction.

RESOURCES:

Reading:	pp. 53 - 54	"Analyzing and Interpreting the Data"
Activity:	pg. 55	
Worksheet:	pg. 56	
Feedback:	pg. 57	

Analyzing and Interpreting the Data

After the survey responses are collected and tallied and all statistics calculated the next step is to analyze the results and interpret the findings for curriculum purposes. Once the appropriate averages and percentages have been claculated, you should rearrange the tasks for easier analysis and interpretation of the data. This process involves making serveral decisions concerning the questions asked about each task. One of the first decisions to make in rearranging the tasks is to determine the percentage of workers that perform a task before it will be considered for instruction. This is based on the rationale that it is inefficient to instruct an entire class on how to perform a task if it is actually performed by a very small percentage of the workers. These tasks may be obsolete or very specialized. In the following example, the tasks first considered are those performed by at least fifty percent of the respondents to the survey. Looking at the sample data in Figure 6, Tasks 1, 2, and 3 would be considered for instruction based on the percent performing criteria.

Figure 6

Data Collected for Duty A

Task	% of workers performing tasks	Mean for frequency	Mean for Criticality
1	95%	1.77	2.89
2	82%	2.54	1.76
3	98%	2.91	2.72
4	27%	1.01	.52
5	45%	.89	2.72

Tasks 4 and 5 should be set aside at this time because they did not have the required percentage of workers performing them. Next, look at the mean value for frequency of performance for the three tasks selected. Decide how frequently a task should be performed before it is to be considered for instruction. In this case, we have arbitrarily decided to choose all those tasks having over a 2.00 relative mean for frequency of performance. This cut off point will let us include all those tasks that are, on the average, performed at least once a month. According to this criteria, Task 1 would be temporarily set aside and Tasks 2 and 3 will be given further consideration. These tasks are next examined for the relative mean value for criticality of performance.

Again, decide on the minimum level of criticality that the task must have to be considered for instruction. Again we have chosen 2.00 as our cutoff point. This would indicate that all tasks in this category have average or above average criticality. According to this criteria, task two would be temporarily eliminated, and task three given further consideration. We now have our tasks ranked according to our three criteria:

Task	%	Performance	Criticality
3	98	2.91	2.72
2	82	2.54	1.76
1	95	1.77	2.89
5	45	.89	2.72
4	27	1.01	.52

As in any ranking procedure, the items at the extremes of the list will be the most discriminated. Task three obviously passes all the criteria for inclusion. It is performed by a large percentage of the workers, it is performed frequently, and is considered highly critical to job success. This task should definitely be given a high priority as an item for instruction. On the other end of the scale, is task four. Very few workers perform this task. It is infrequently performed, and has low importance to job success. This task can be given a very low priority as an item for instruction.

The closer to the middle of any ranking, the less discrimination there is between tasks. Look at tasks two and one. Both are performed by a large percentage of workers, but they have varying ratings on the relative means for performance and criticality. Task two is performed very often, but is below average criticality. Task one is performed infrequently, but is considered very critical to job success. Both tasks have strong indicators that they should be included in consideration for instruction.

Task five provides an interesting problem to interpreting the data. It is performed by less than fifty percent of the workers, is performed very infrequently, but it critical to job success. In this case, the instructor must look at the nature of the task and decide its priority. The task may be some emergency or safety practice that is performed by only a few workers infrequently, but it is vital that the procedure be performed correctly when necessary.

These examples illustrate one way to rank and reorder the tasks into priority levels for consideration for instruction. There are other educational considerations that should be taken into account when reviewing the data analysis, drawing conclusions, and making decisions about instruction. Some tasks may provide a good medium for teaching a certain skill or they may have student motivational value. Some tasks, although not performed often, may be basic to learning more advanced tasks. Local considerations, such as these, can be determining factors for tasks that are not clearly discriminated by the survey data.

ACTIVITY:

1. Rank the following tasks according to percent, frequency, and criticality. Minimum levels to be used: fifty percent or more of the workers must perform the task – values of 2.00 or greater for frequency and criticality.

Task	%	Frequency Value	Criticality Value
1	57	1.69	2.03
2	74	2.26	2.38
3	35	1.35	1.74
4	62	1.88	2.11
5	83	2.45	2.52
6	88	2.62	2.46
7	26	1.60	2.03
8	77	2.29	2.38
9	28	1.18	.60
10	78	2.31	1.45
11	34	1.29	1.66
12	63	1.92	2.08
13	97	2.80	2.72
14	80	2.38	2.51
15	62	1.98	2.15

2. Circle the group of tasks that would definitely be considered for instruction. Strike out tasks which could be eliminated. Draw a line under tasks which need further consideration. Star the task that poses a special problem.

WORK SHEET

Task	%	Frequency Value	Criticality Value

FEEDBACK:

1.

Task	%	Frequency Value	Criticality Value
13	97	2.80	2.72
6	88	2.62	2.46
5	83	2.45	2.52
14	80	2.38	2.51
8	77	2.29	2.35
2	74	2.26	2.38
10	78	2.31	1.45
12	63	1.92	2.08
15	62	1.98	2.15
4	62	1.88	2.11
1	57	1.69	2.03
7	26	1.60	2.03
3	35	1.35	1.74
11	34	1.29	1.74
9	28	1.18	.60

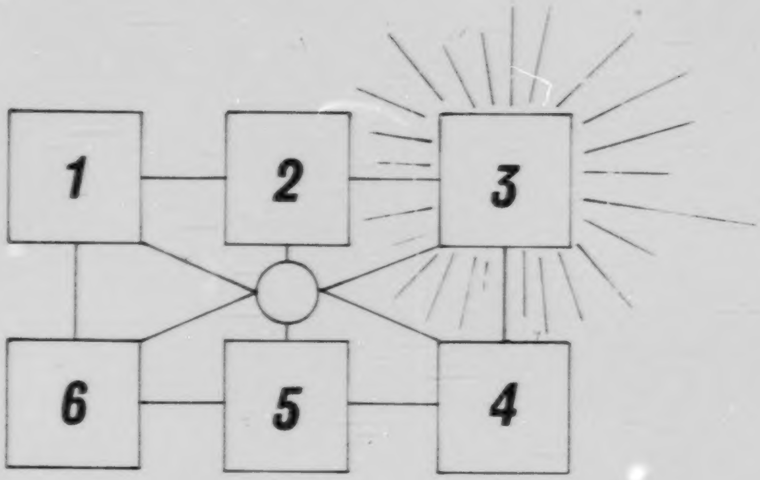
2. Tasks 13, 6, 5, 14, 8, and 2 would definitely be included for instruction. They meet all three minimum criteria levels.

   Tasks 3, 11, and 9 would be eliminated from consideration, in that they meet none of the minimum levels.

   Tasks 10, 12, 15, 4, and 1 need to be further evaluated. They meet two out of three of the minimum criteria levels.

   Task 7 poses a special problem, in that it is performed by a low percentage of workers and is performed infrequently, but is highly critical when it is performed.

5529



OCCUPATIONAL ANALYSIS

by:
Tom L. Hindes

INTRODUCTION

This module has been prepared to aid you in understanding and using the analysis process. Since there are varying needs concerning the use of occupational analysis this module has been designed to satisfy three levels of competence.

Level I — awareness
Level II — knowing and understanding
Level III — application

Each level has a general goal or competency and a list of specific objectives. Your specific needs should fall under one of the three levels. Level I is exactly what the description says — being aware of the occupational analysis process, and having some very rudimentary understanding of the analysis concept. Level II is more in-depth and gets at knowing and understanding the analysis process and being able to relate the process to designing instruction. Level III involves not only an awareness and understanding, but being able to apply the learned knowledge to the analysis process, and being able to conduct an analysis.

Once you have selected the level to which you will work, you may use this module to work through the analysis process at your own rate, utilizing several mediums to achieve the desired outcomes.

MODULE OBJECTIVES

General Objective – Level I

1. You will be aware of the Occupational Analysis process.

You will demonstrate attainment of this objective by:

- a. Defining "Occupational Analysis"
- b. Explaining the need for Occupational Analysis
- c. Defining the taxonomy of an occupation
- d. Defining "Knowledge" and "Skills"
- e. Listing the types of data collected by the analysis process

General Objective – Level II

1. You will know and understand the Occupational Analysis process.

You will demonstrate attainment of this objective by:

- a. Defining "Occupational Analysis"
- b. Explaining the need for Occupational Analysis
- c. Defining the taxonomy of an occupation
- d. Differentiating between jobs, duties, tasks, and steps
- e. Recognizing a well written task statement
- f. Defining "Knowledge" and "Skills"
- g. Listing the types of data collected by the analysis process
- h. Explaining the relationship between the analysis and the planned instructional program

General Objective – Level III

1. You will apply the various procedures and strategies involved in the Occupational Analysis process.

You will demonstrate attainment of this objective by:

- a. Defining "Occupational Analysis"
- b. Explaining the need for Occupational Analysis
- d. Defining the taxonomy of an occupation
- d. Charting an occupation by duty – task – steps
- e. Defining "Knowledge" and "Skills"
- f. Writing well-stated task statements
- g. Listing the types of data collected by the analysis process
- h. Analyzing sample tasks to the degree that is sufficient to develop instruction
- i. Explaining the relationship betwen the analysis and the planned instructional program

These objectives may be met by:

1. Working through this study guide
2. Sitting in on discussions with consultants
3. Reading selected references

Certain portions of the following references are available for further study.

Coit Butler, *Instructional Systems Development for Vocational and Technical Training,* Educational Technology Pub.

William Melching & Sidney Borcher, *Procedures for Constructing and Using Task Inventories,* CVTE.

Robert M. Gagne, Editor, *Psychological Principles in System Development,* Holt, Rinehart and Winston, pp. 187–228, Chapter by Robert B. Miller.

4. Participating in small group work sessions

EXEMPTION TEST – OCCUPATIONAL ANALYSIS

The first step in this module is to determine if you need instruction in occupational analysis, or if you already have the knowledge and skills in question. So, you are now being asked to take an exemption test. In general, the exemption test is administered to assess achievement of the module objectives. This exemption test is taken before instruction; passage exempts the learner from all or part of the instruction.

1. Define *"Occupational Analysis":*

2. Why is occupational analysis such an important part of the design of instruction?

3. Give one accepted definition for each of the following:

   Job –
   Duty –
   Task –
   Step –

4. Read the following items and identify each by selecting the appropriate code. Write the code letter in the spaces provided.

   Job – J
   Duty – D
   Task – T
   Step – S

____a. Answer telephone
____b. Secretary
____c. Talk with visitor
____d. Take message
____e. Reception
____f. Make visitor feel comfortable
____g. Screen unwanted calls
____h. Polish lacquer finish
____i. Auto body mechanic
____j. Determine hand or power polish
____k. Mix and reduce refinishing materials
____l. Refinishing
____m. Feather-edge broken surfaces
____n. Choose proper reducers

5. For each of the following task statements, draw a circle around the performance and underline the object to be acted upon. If the statement is a poor statement place an X in front of it.

____a. Answer the telephone
____b. Type and correct a stencil
____c. Proofread correspondence
____d. Operate paper punch
____e. Proofread
____f. Assist in continuity
____g. File absence lists
____h. File by number

6. Define *knowledge.*

7. Define *skills.*

8. Select the best stated TASK STATEMENTS from the following. Place a checkmark (√) in front of your choices.

____a. Have responsibility for general repair
____b. Maintain files
____c. Understand P.O.I.
____d. Proofread memos
____e. Determine circuit continuity with multimeter
____f. Perform editing process
____g. Attend classes
____h. Able to adjust clutch

9. Have you ever used the format on page to analyze a task?

____yes
____no

FEEDBACK: *The contents of this module describes the criteria for the acceptable answers to questions 1, 2, 3, 6, and 7 on this exemption test. For these questions, please refer to the appropriate page and compare your written responses to that material. For questions 4, 5, 8, and 9 the following is the criteria of acceptability:*

4. a. T, b. J, c. T, d. S, e. D, f. S, g. S, h. T, i. J, k. S, l. D, m. T, n. S
5. a. Answer the telephone, b. type and correct a stencil, c. proofread correspondence, d. operate paper punch, e. X proofread, f. X assist in continuity, g. file absence lists, h. X file by number
8. You should have checked b, d, e, f.
9. Yes

OCCUPATIONAL ANALYSIS

It is said that an occupation is the central activity of modern man. Today there exists over 20,000 different occupations. Are there differences between these occupations? Obviously yes! But what makes an auto mechanic different from a plumber or a nurse different from a cosmotologist? The difference between occupations is found in what the incumbants, do and what they do is composed of the applications of *skills* and *knowledges* in performance. We, as educators are concerned with teaching the *skills* and *knowledges* that are necessary to function in various occupations. In order to identify these *skills* and *knowledges* we must conduct an analysis of the occupation. Occupational analysis is a process that examines an occupation and lists the various performance *skills* and *knowledges*, which in total make up the occupation. The total work environment of an occupation may contain a vast number or elements which could be identified and analyzed. Within this list there exists items that are most critical to the learning process as related to occupational performance. The analysis process must identify these critical items.

DEFINE OCCUPATIONAL ANALYSIS:

FEEDBACK: *Occupational analysis is a process that examines an occupation and lists the various performance, skills and knowledges which in total make up the occupation.*

JOBS

Occupational analysis starts with an identified job or cluster or closely related jobs and moves through a process which will result in the listing of skills and knowleges which are required for the performance of tasks in the job or jobs. We must start with an identified job, if we expect to analyze required performance.

The term *job* is used to denote the occupation or position title of someone employed. One is employed in a job. A job title identifies the occupation in which one is employed. Jobs are generally classified according to groups of similar skills and knowledges. The titles Machinist, Secretary, Medical Assistant and Welder are examples of jobs.

In the space listed below, place a checkmark before each example of a job.

____1. Auto Mechanic
____2. Type a letter
____3. Carpenter
____4. Distribution
____5. Locate tools

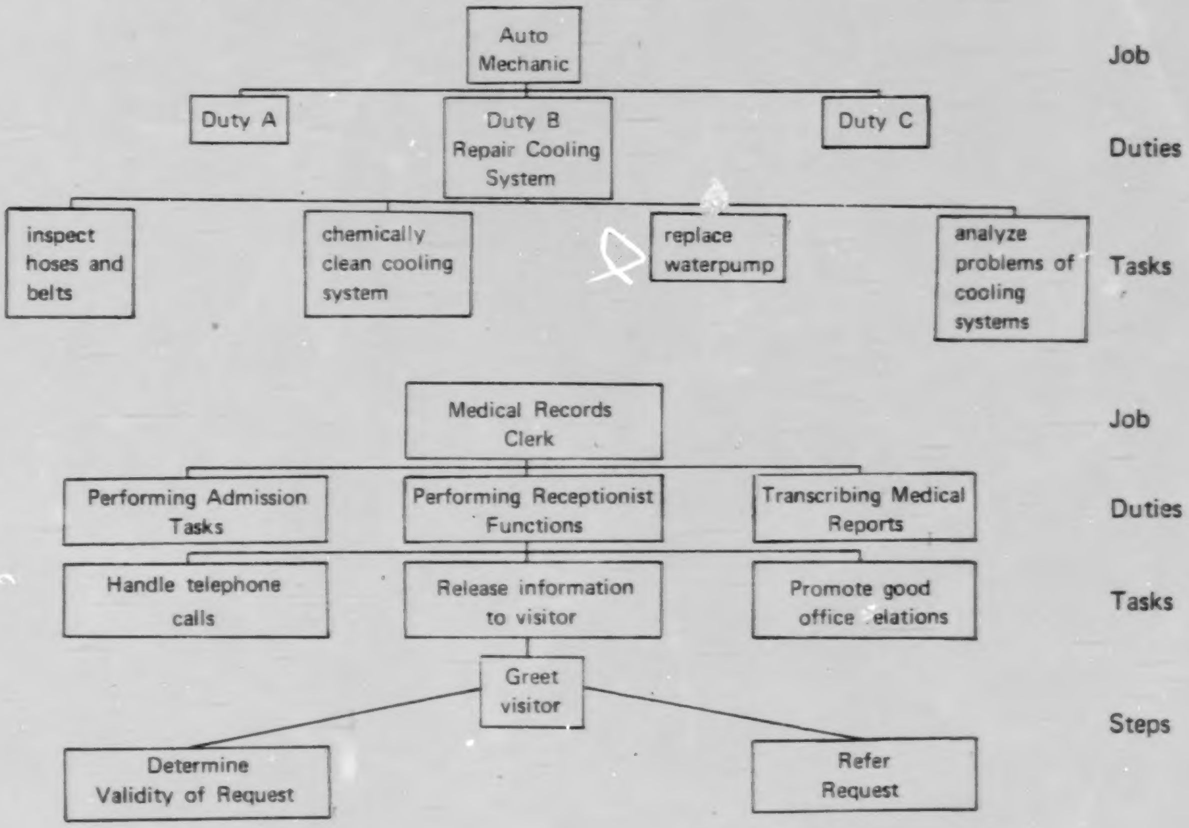
FEEDBACK: *You should have selected 1 and 3.*

Once the job has been selected and identified we must break the job down into smaller units or divisions. We start with the job as being a general statement, and work towards the "specific" steps that are performed within the job. For the purpose of this module the following organizational definition has been adopted.

> Jobs are groupings of related responsibilities for human performance.
> These responsibilities are called DUTIES.
> Duties are groupings of logically related tasks which must be executed by an individual.
> Tasks are groupings of steps.
> Steps are the mental and physical actions performed by individual workers.

For example, consider the job of Auto Mechanic. Once duty of this job is repairing the cooling system. Included in this duty are smaller units of work called TASKS. Such tasks as "chemically clean the cooling systems," "replace waterpump" and "analyze problems of the cooling system" make up the larger duty of repairing the cooling system. Each of the tasks can in turn be broken down into smaller units of work called steps.

The following figure shows the relationship among the JOB, DUTIES, TASKS and STEPS for the jobs "Auto Mechanic" and "Medical Records Clerk."


Auto Mechanic
Job
Duty A
Duty B Repair Cooling System
Duty C
Duties
inspect hoses and belts
chemically clean cooling system
replace waterpump
analyze problems of cooling systems
Tasks
Medical Records Clerk
Job
Performing Admission Tasks
Performing Receptionist Functions
Transcribing Medical Reports
Duties
Handle telephone calls
Release information to visitor
Promote good office relations
Tasks
Greet visitor
Steps
Determine Validity of Request
Refer Request

DUTIES

Duties are large segments of work made up of related tasks. If you have access to an inventory of tasks you may find the inventory already divided up by duties. If the inventory is not divided into duties you have to consult written descriptions of the job. * Normally the duties you will list, will be either performance duties or supervisory duties. Supervisory duties are similar for most jobs. They include organizing, planning, directing and evaluating. Performance duties vary with each specific job. You will find the major performance duties in work functions assigned to people. Other duties may be found in functional or organizational charts which indicate the organization of the work activities and processes. Some jobs are highly involved with equipment. The duties in these jobs may be based upon the equipment and its operation. Some jobs are broken down by functional work divisions or departments. The duties in these jobs may be found in the specific function for each division or department within a total operation. Some jobs are broken down by systems. The duties in these jobs may be structured according to equipment systems or process systems. For any job, the duties will be logical decisions or sections.

In the space listed below, place a checkmark before the examples of duties.

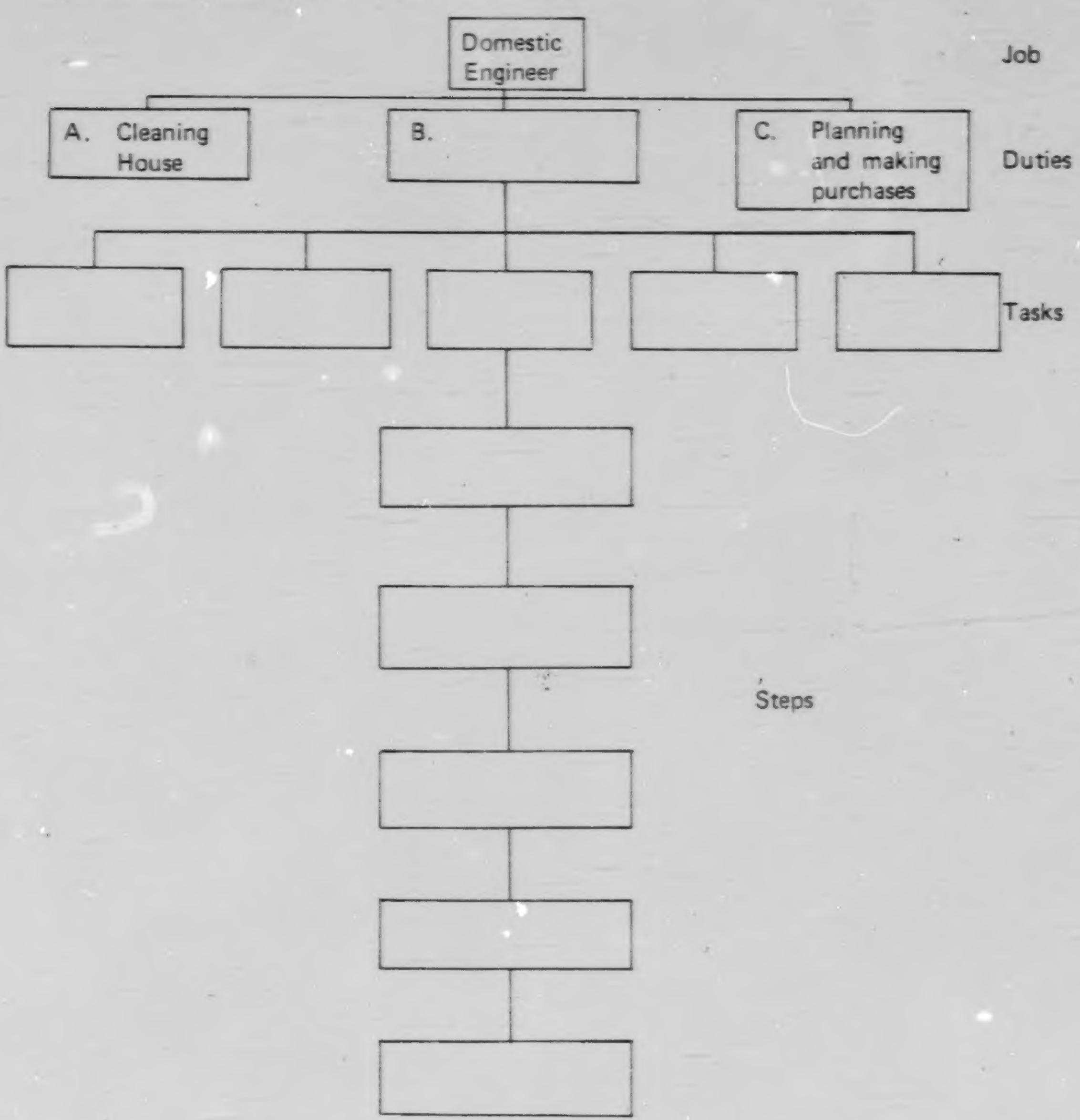
_____ 1. (Job – Auto Mechanic) – Maintaining/repairing fuel systems
_____ 2. (Job – Secretary) – Performing reception activity
_____ 3. (Job – Auto Mechanic) – Adust carburator
_____ 4. (Job – Secretary) – Type a letter

---

* Since duties are larger groupings of related tasks, many job descriptions merely are a listing of the duties in a narrative form.

FEEDBACK: *You should have checked 1. "Maintaining/repairing fuel systems" within the job of Auto Mechanic, and 2. "Performing reception activity" within the job of Secretary. Numbers 3. and 4. are examples of tasks, a smaller unit of work.*

For the job *"Domestic Engineer"* complete Duty B. List five tasks which may be included with your selected duty. For one of the tasks you list write down five steps that are performed as a part of the task.


Domestic Engineer
Job
A. Cleaning House
B.
C. Planning and making purchases
Duties
Tasks
Steps

The first step in Occupational Analysis is selecting the tasks that make up the performance requirements of the occupation under analysis. These tasks should have been stated in such a manner that they accurately describe the required worker performance.

A task is a discrete unit of work performed by one person as part of his/her total job responsibilities. A task statement is a written description of an actual task. As such, task statements should describe logically complete sets of steps which which have a specific beginning point, a specific ending point and occur within a specified time frame. Examples of common Receptionist tasks.

Greet visitors
Maintain visitor book
Issue visitor passes
Answer incoming calls
Verify telephone bills
Place long distance calls
Process mail
Make and confirm travel reservations
Conduct tours
Collate reproduced materials
Operate transcribing equipment
Address letters
Proofread type written copy

These and all tasks should specify the action(s) performed and the objects that receive the action(s).

Verify telephone bills
↑ ↑
action object that receives action

In the space listed below, place a checkmark before each item that is a task statement.

A. Understand principles of heat
B. Replace a waterpump
C. Type letters
D. Manage a business
E. Transcribe shorthand
F. Audit petty cash

FEEDBACK: *You should have checked, B., C., E. and F.*

STANDARDS:

CLARITY

The standard of clarity requires that a task statement identify without question the unit of work to be performed.

RULES:

1. Use wording that is easily understood.
2. Be precise so the statement means the same thing to all personnel.
3. Write separate, specific statements for each task.
4. Avoid combining vague items of skill, knowledge, or responsibility.

EXAMPLES:

CORRECT	INCORRECT
Supervise files. Maintain files.	Have responsibility for maintaining files.
Rate worker performance against job requirements.	Relate results to need of field.

TEST: Identify the correct form for task statement in the following examples. Write "C" for correct or "I" for incorrect in front of each statement.

1.__ Type names and addresses for mailing lists.

2.__ Remove addresses from mailing list.

3.__ Involved with determining problems.

4.__ File address lists.

5.__ Handle correspondence.

FEEDBACK: *You should have marked statements 1, 2, and 4 as correct and 3 and 5 as incorrect. Statements 3 and 5 do not specify what action is to be taken and therefore do not meet the standard for clarity.*

TASK STATEMENT STANDARDS

COMPLETENESS

STANDARDS:

The standards of completeness requires that all necessary information be included in the statement so it may be fully understood across various work environments.

RULES:

1. Avoid the use of abbreviations. Spell out the term followed by the abbreviation.
2. Include the title or identification of special tools, forms or equipment only when the task statment requires such specific items to be correctly understood. Use the general type of term when it is sufficient.

EXAMPLES:

CORRECT	INCORRECT
Write instructions for management by objectives (MBO).	Write guide for MIS and JPR.
Complete task description worksheet. Solder contacts and terminals with 60/40 acid core.	Submit reports. Drill holes in wall using reqular hand drill and bits.

TEST: Identify the correct form for task statements in the following examples. Write "C" for correct or "I" for incorrect in front of each statement.

1. _____ Fill-out 100W purchase order
2. _____ Report various activities performed.
3. _____ Prepare cost estimates for O.J.T.
4. _____ Erect temporary scaffolding.
5. _____ Write production reports

FEEDBACK: *You should have marked statements 1,4, and 5 as correct and 2 and 3 as incorrect. Statement 2 does not specify what activities should be reported and statement 3 used and undefined abbreviation.*

TASK STATEMENT STANDARDS

STANDARDS:

CONCISENESS

The standard of conciseness requires that the task statement provide all necessary information in as few words as possible. They should be accurate and to the point.

RULES:

1. Task statements should be brief. Avoid using statements which are too broad or general in meaning.
2. Begin the statements with a present-tense action word.
3. The subject "I" or "YOU" is understood but not written.
4. Identify the object on which the action is to be performed.
5. Use current occupational terminology.

EXAMPLES:

CORRECT	INCORRECT
Write training plans and schedules.	Develop necessary plans for training programs and schedule all facilities, to be used in programs.
Clean engine. Replace elevator control switch.	Use steam cleaner for degreasing. Repair faulty elevator.

TEST: Identify the correct form for task statements in the following examples. Write "C" for correct or "I" for incorrect in front of each statement.

1. ___ I perform all essential repairs.
2. ___ Perform counting process
3. ___ Proof read memos
4. ___ Check circuits with multimeter
5. ___ Learn the split-half trouble shooting technique

FEEDBACK: *You should have marked statements 3 and 4 as correct. Statements 1, 2, and 5 are incorrect. Statement 1 is to general and includes the pronoun "I". Statement 2 fails to indicate object that is to be counted. Statement 5 is an objective not a performance task.*

RELEVANCE

STANDARDS:

The standard of relevance requires that the task statement provide informa which describes the direct action of the worker.

RULES:

1. Don't state a person's qualifications.
2. Don't include items on receiving instruction, unless actual work is performed.
3. Avoid including information about prior tasks whenever possible. Do not use multiple verbs unless several actions are always done together.

EXAMPLES:

CORRECT	INCORRECT
Plumb a wall partition.	Has one year carpentry experience.
Demonstrate camera use.	Attend a lecture.
Replace contact points.	Inspect, remove, repair and replace. pump motor.

TEST: Identify the correct form for the task statement in the following examples. Write "C" for correct or "I" for incorrect in front of each statement.

1. ___ Able to write correct objectives
2. ___ Read disassembly procedures and disassemble internal valve.
3. ___ Adjust internal valves in fluid coupling.
4. ___ Type 60 words per minute with no errors.
5. ___ Replace main fuse in power console.

FEEDBACK: *You should have marked statements 3 and 5 as correct. Statements 1, 2, and 4 are inccorect. Statements 1 and 4 relate abilities not actual performance. Statement number 2 includes non-essential information about a prior task.*

SKILL AND KNOWLEDGE

The required performance of the tasks by the students will become the objective of the instructional program. Thus having determined what the student must do at the end of his/her training (task performance) we must list all knowledges and skills required for the performance of each task.

There is a direct relationship between the identification of skills and knowledges and the level of task performance. As task performance becomes less routine and more decisions and judgements must be made by the worker his/her need for more knowledge and skill will increase.

In the space listed below, place a "c" before each correct statement.

____1. Tasks which are routine and require no judgements and decisions will require a smaller amount of knowledge.

____2. Tasks which require judgements and decisions will also require more knowledge.

FEEDBACK: *You should have selected both 1. and 2.*

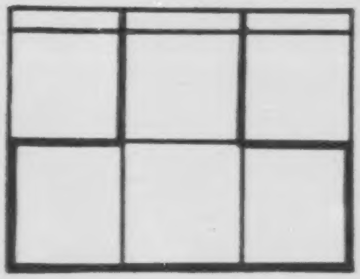
ANALYSIS FORMAT

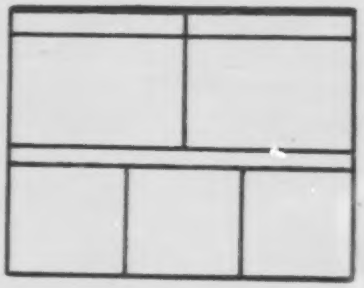
One of the most important and critical aspects of the analysis process is the orderly development of information about the job. The various information that you collect will be massive, and an orderly reporting form is a must. For the actual analysis part of the ISD process we start with a list of the tasks that make up an occupation. This list has been screened and in the final list are the tasks that require instruction. This final list of tasks should also be organized under the various duties of the occupation.

In the actual analysis process you will collect thirteen general or specific types of information for each selected task.

1. tools, equipment, supplies
2. critical performance steps
3. decisions
4. cues
5. errors
6. safety
7. hazard
8. physical science
9. behavior science
10. math or number systems
11. communication performance mode
12. communication example
13. communication skill/concept

In order to facilitate the gathering and reporting of this information the following format has been developed.





It is important that you follow the step by step process beginning with listing the tools, equipment and object acted upon, and move down the list.

The thirteen types of information that must be reported may be gathered by any of the following methods.

1. Interviews
2. Questionnaires
3. Task observation of expert performance
4. Simulation
5. Making assumptions

The technique that one uses to collect this information will depend on the constraints in each situation. You will have to consider time constraints and the availability of people.

TECHNIQUE	+	—
IN-PERSON INTERVIEW	high response rate most information for time spent most accurate information	time extraneous information
QUESTIONNAIRE	yields much information	returns tend to be slow difficult to design
OBSERVATION	exactly what people do not what they say they do	time requires skilled observer
SIMULATION	can be a talk-through	results may not transfer directly to job
MAKING ASSUMPTIONS	allows instructional development to progress on the basis of "best guess"	assumptions must be verified later

The collection methods you will use in this module are a combination of: *simulation* and *making assumptions.*

ANALYSIS PROCESS

The remainder of this module is concerned with the actual process of collecting and reporting the task information. The module presents an example task "wash and dewax a car," and at each step of the analysis process certain sample information is provided. You should select a *task statement* to follow through the steps of analysis, and report information for your selected task. This information may be reported on the analysis worksheets in the appendix of this module. Fold the appropriate analysis worksheet out and record the called for information in the appropriate space.

SUGGESTED TASK STATEMENTS

1. Mow residential lawn with gasoline rotary mower.
2. Prepare bacon and eggs breakfast.
3. Press a shirt with electric iron.
4. Hem a dress.

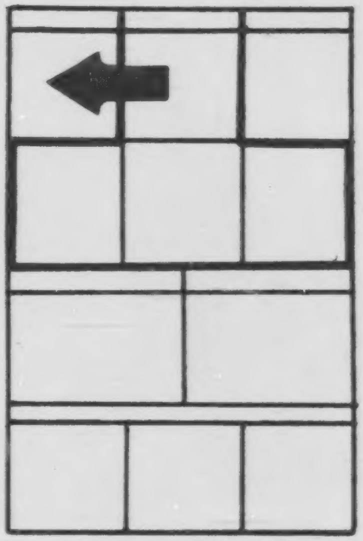
STEP #1

Write out the full task statement (that you selected) at the top of the analysis worksheet.

Example: *"Wash and Dewax Vehicle"*

STEP #2

The first information to report will be reported in the tools, equipment material objects acted upon block. In this block, list the tools, equipment, supplies, materials and references which must be available to and used by the worker during task performance. In some tasks you will have to identify the people who will be involved in the task other than the worker, such as clients, patients, assistants or supervisors.



Task: *"Wash and Dewax Vehicle"*

Example

Tools, equipment, materials, objects acted upon
Hose and water Bucket and sponge Car wash soap Chemical dewaxer Toweling Clean rags Vehicle

Excercise:

List all tools, equipment, materials, and objects acted upon for the task that you selected. Use the analysis worksheet in the appendix to report this information.

PERFORMANCE AND KNOWLEDGE

The next section of the format is titled "Performance and Knowledge." In order to understand the type of information to include in this section, and how to identify the information we must define *behavior*. When we talk of behavior we must relate it to learning.

Simply stated, learning is a change in behavior. To illustrate this with an example, a student receives a lesson designed to teach how to clean a typewriter. Before the instruction, he/she could not do this task. But after the instruction he/she can perform the task because the instruction has changed his/her behavior. Learning, then, can be said to be that change in behavior that results from the teaching-learning activity.

Overt behavior is that which you can see and measure. In the example above, the instructor can see the student clean the typewriter. He/she knows that the student's behavior has been changed. Covert behavior is the mental activity which cannot be seen or measured, but is essential to overt activity. The student thinks *covertly* and performs *overtly*.

In instructional design, behavior is defined as activity, either observable or unobservable. Which of the following are examples of behavior?

Place a checkmark before your selection.

____a. Answering the telephone
____b. Stating rules of operation
____c. Mentally solving a problem
____d. Breathing

It is difficult to think of verbs that do not refer to behavior because:

____a. Behavior is always observable.
____b. Behavior is any activity, either observable or unobservable.
____c. Behavior is activity that cannot be observed.

FEEDBACK: *According to the first question, all are correct.*
According to the second question, the correct answer is b.

Covert is the term used in reference to behaviors such as thought and reasoning. This leads to the conclusion that: (check one)

____a. Covert behavior is observable behavior.
____b. Covert behavior is unobservable behavior.

List at least three OVERT and five COVERT behaviors suggested by the following situation.

A person preparing bacon and eggs.

COVERT	OVERT

FEEDBACK: *According to the first question, the correct answer is b.*

KNOWLEDGE

Knowledge involves the acquisition of information, learning the sequence of steps required to perform a complex process, the learning of abstractions, principles, generalizations and theories, remembering either by recognition or recall, facts, concepts, events, principles and theories.

Knowledge requirements fall into three general categories:

1. The knowledge content itself, in the form of a concept, rule or principle.
2. Identifying when and where the knowledge has to be applied in the work situation.
3. The practical application of the knowledge in a particular situation.

Knowledges are not directly observable. They involve mental processes which enable a person to use symbols. A person knows something when he/she shows he/she has used the symbols associated with it.

Place a checkmark before those items that are examples of knowledge.

____a. Addition
____b. Rules of driving
____c. Sawing a board
____d. Drilling a hole

FEEDBACK: *You should have selected a and b.*

SKILLS

Skills involve physical or manipulative activities. They often require knowledge for their execution. All skills are actions having special requirements for speed, accuracy or coordination. Actions lacking such requirements are not skills. They are unskilled activities. The relationship that exists between skills and knowledge is often times very close. In most instances the physical activity is the observable product of having and using knowledge. Without knowledge and the ability to use it, people may not be able to work with speed and accuracy in performing certain tasks.

When determining skills and knowledges necessary for the successful performance of a task you must think about the skills you go through in order to complete the task. You must recreate the task and its step by step completion in your mind. These steps are important, because the skills and knowledges related to the task will show up at the step level.

Skills involve physical or manipulative activities. They often require knowledge for their execution. All skills are actions having special requirements for speed, accuracy, or coordination. Actions lacking such requirements are not skills. They are unskilled activities.

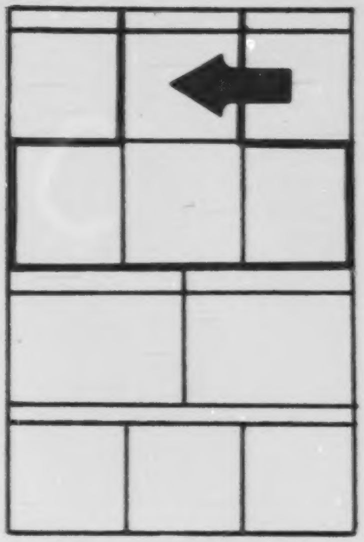
Place a checkmark before those items that are examples of skills.

____a. Mix concrete
____b. Grind to specification
____c. Opening door

FEEDBACK: *You should have selected a and b.*

STEP #3

In the block "Performance/Knowledge" you should describe the observable performance involved in the complete task. You should list the critical steps and procedures that a worker follows in performing the task. You should list the steps in their routine sequence. Be sure to list all steps and procedures which require special skills. Refer back to your listing of tools, equipment and objects acted up upon and be sure you have provided for each of them.



Sample — Task: *"Wash and Dewax Vehicle"*

Example

Performance/Knowledge
Mix soap and water in bucket
Wash car
Dry car
Apply dewax
Wipe dry

The task "wash and dewax vehicle" is a relatively simple task, that is primarily psychomotor in nature. This is not to say that the worker performs this task without using any knowledge. But the knowledge content of this task is minimum. Some tasks that may be encountered have significantly more of a knowledge requirement, and during performance, will be highly cognitive in nature. Consider the task "identify training requirements" from the duty "developing training curriculum."

Task: *"Identify Training Requirements"*

	Performance Knowledge
STEPS	
	1. Obtain job performance requirements
	2. Identify knowledge, skills and proficiency requirements
	3. Determine if training standard exists
	4. If training standards exist — modify
	5. Prepare final training standard
	6. Determine type of course

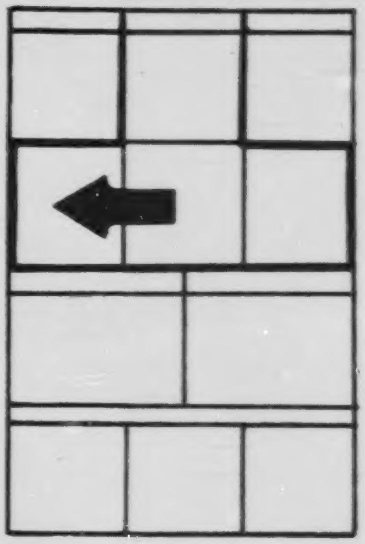
List the critical steps involved in the task you selected. Use the analysis worksheet in the appendix to report this information.

STEP #4

After you have described the steps that the worker goes through in performing the task, you should read over these steps and determine if, during the work performance, the worker must make any decisions. A decision exists whenever a choice must be made. Read through the steps and identify words which imply a or decision.

Place a checkmark in the space provided for each word that implies a decision to make:

____1. choose
____2. pull
____3. plan
____4. decide
____5. select
____6. determine
____7. attach
____8. write
____9. differentiate
____10. measure



Example – Task: *"Wash and Dewax Vehicle"*

Decisions
Determine type of dewaxer to use.

FEEDBACK: *You should have selected the following words that imply the need for a decision: 1. choose, 3. plan, 4. decide, 5. select, 6. determine, 9. differentiate*

Remember the task that has considerably more knowledge content, and require considerably more cognitive performance skill?

Task: *"Identify Training Requirements"*

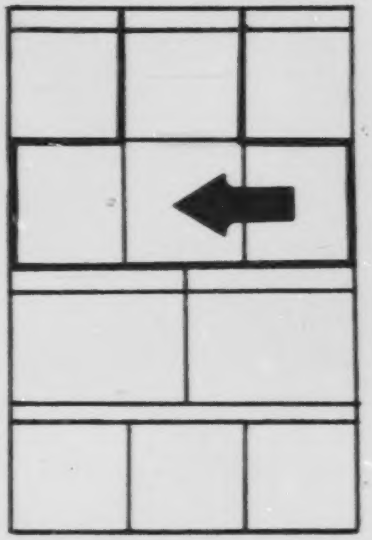
Remember that tasks which have more cognitive content usually have more complex decisions. Consider the decisions which the worker must make when performing the task "identify training requirements."

Decisions
1. Determine skill for each task.
2. Determine knowledge for each task.
3. Determine type of knowledge for each task.
4. Determine proficiency level for each task.
5. Determine if training standards exist.
6. Should training standards be modified?
7. Decide on type of course to plan.

Exercise: List any decisions that must be made during the performance of the task you selected. Use the analysis worksheet in the appendix to report this information.

STEP #5

For each decision that the worker must make, there are specific cues that will assist him/her at arriving at the correct decision. You should list any sign, signals, or variables the worker takes into consideration when making the listed decisions. List the cues which are standard routine elements but which require the worker to be aware of their existance.



Sample – Task: *"Wash and Dewax Vehicle"*

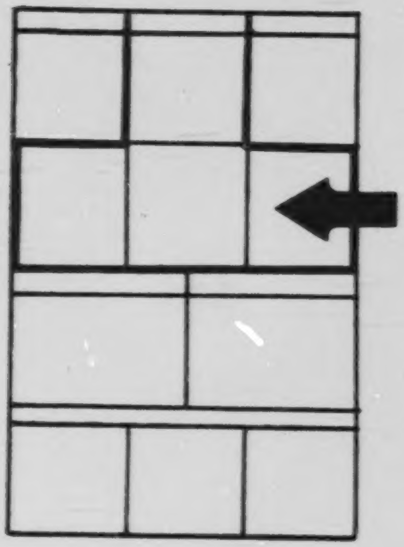
Example

Cues
Amount of road film Amount of road tar Amount of tree sap

Exercise: List any cues that assist in making the decisions that you listed for your selected task. Use the analysis worksheet in the appendix to report this information.

STEP #6

For each decision, there is also an error or a possible failure. List any errors or failures which result from improper or incorrect decisions. Identify the failure conditions that a worker must be able to recognize.



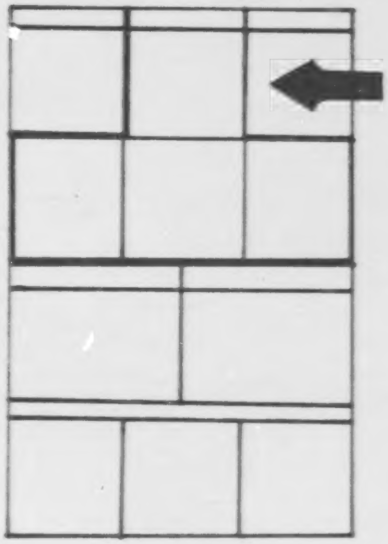
Example

Errors
Damage to painted surfaces

Exercise: List any errors which result from improper or incorrect decisions for your selected task. Use the analysis worksheet in the appendix to report this information.

STEP #7

In the block SAFETY/HAZARDS list the key safety rules that must be followed for a safe task and step performance. Identify the types of hazards that exist in the task environment. Identify the type of injury or damage which can result from unsafe performance.



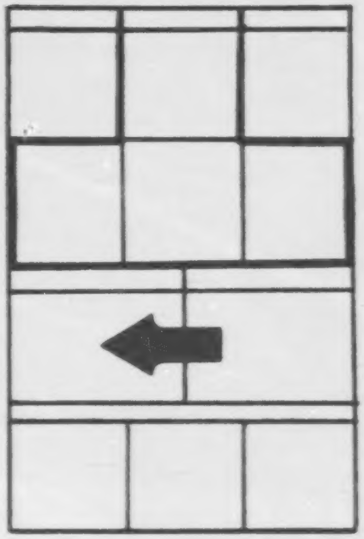
Example

Safety-Hazard
Eye protection – Eye injury Dewaxers are flammable – fire Proper ventilation – fire, breathing Dewaxers will burn the skin.

Exercise: List any safety and hazards which exist in the work environment of your selected task. Use the analysis worksheet in the appendix to report this information.

STEP # 8

Identify the principles, rules, concepts, and/or generalizations of science that apply to task performance. List the key concepts, rather than detailed facts, which must be understood by a successful worker. Consider both the natural sciences and the social sciences related to the task.



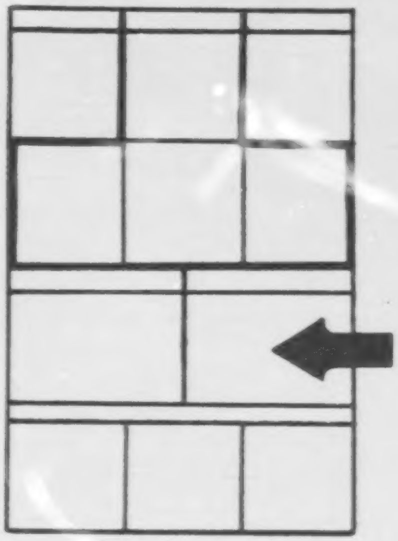
Example

Science
Effects of friction on work
Rubbing with sponge and dewaxer to remove foreign matter
Exercise care of tools and equipment, and objects working in "Customer Relations."

Exercise: List any key concept which must be understood by the successful worker for your selected task. Use the analysis worksheet in the appendix to report this information.

STEP #9

Identify the math skill or function which is applied during the task performance. Give a specific example of what is actually done by the worker using the listed math skill. Identify the math material ideas and concepts that must be understood for efficient task performance.



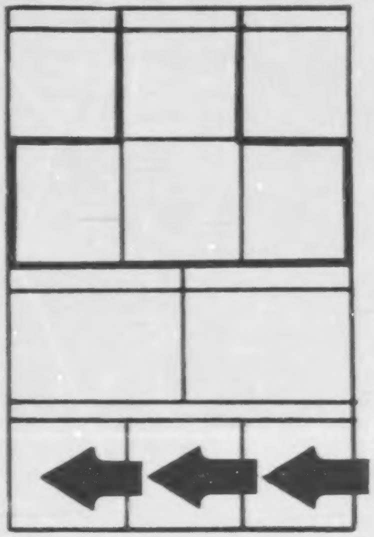
Task: *"Wash and Dewax Vehicle"*

Example
Math — Numbers Systems Use of numbers (without calculation) (ratio — soap to water) Coding

Exercise: List what is actually done by the skilled worker for your selected task. Use the analysis worksheet in the appendix to report this information.

STEP # 10

Under communications there are three types of information to report, performance mode, an example and the skill or concept. Within the performance mode block identify each basic type of communication that takes place during the task performance. Under examples list the specific example of how each communication mode is involved in the task. Under Skills/Concepts list the basic communication skills needed to accomplish each mode of communication. Identify the concepts and rules of communications that must be understood for efficient task performance.



TASK – *"WASH AND DEWAX VEHICLE"*

Examples

Performance Mode	Example	Skills/Concepts
Reading	Direction on containers	Information reports, recommendation reports, description of mechanism terminology/general vocabulary, clarity of expression

EXIT TEST – OCCUPATIONAL ANALYSIS

____behavior
____covert
____cues
____occupational analysis
____duty
____learning
____skill
____overt
____task
____job

a. Process which examines an occupation and lists the performance skills and knowledge which in total make up the occupation.
b. Identifies an occupation by name.
c. Larger segments of work made up of related tasks.
d. Discrete groupings of steps.
e. Any activity.
f. Observable behavior.
g. Unobservable behavior.
h. Physical activity requiring speed, accuracy or coordination.
i. Provides in decision making.
j. A change in behavior.

Read the following task statements, place an X in front of the ones not meeting acceptable standards, circle the performance and underline the object acted upon.

a. process mail
b. verify telephone bills
c. write repair estimates
d. install frame gauges
e. understand circuits
f. learns addition
g. check A.P.R.

a. responsibility for auditing
b. write various reports
c. perform itemizations
d. correct stencils
e. answer incoming calls
f. type memos
g. order parts

For each of the following information gathering methods list at least one advantage and one disadvantage.

	Advantage	Disadvantage
INTERVIEW		
QUESTIONNAIRE		
OBSERVATION		
SIMULATION		
MAKING ASSUMPTIONS		

Place a T before each statement you feel is true, and an F before each statement you feel is false.

____a. The most accurate method to measure whether a person has learned knowledge is to observe how he/she uses the knowledge.

____b. Skills do not involve knowledge for their execution.

____c. Skills are actions having special requirements for speed, accuracy or coordination.

____d. In most instances, physical activity is the observable product of having and using knowledge.

____e. Manipulative tasks require extensive knowledge of principles for adequate performance.

____f. You can know about something, but not be able to do it.

____g. In step #3 of the analysis process you will list the critical steps by describing the observable performance.

____h. Decisions made by the worker while performing the stated task do not involve knowledge.

____i. For each decision made during the performance of a task there is a corresponding CUE.

____j. SAFETY and HAZARD are the same.

FEEDBACK: *a. True, b. False, c. True, d. True, e. False, f. True, g. True, h. False, i. True, j. False*

For each of the following statements, identify whether they are a duty, task or a step. Use the following letters.

D – Duty
T – Task
S – Step

"Domestic Engineer"

____Inspect sweeper bag.
____Wash windows.
____Select wax.
____Wipe off glass cleaner.
____Scrub floors.
____Buff dried, waxed floor.
____Plug in and sweep.
____Secure rags.
____Apply wax to floor.
____Move furniture.
____Apply cleaner to glass.
____Wax floors.
____Mix cleanser with water.
____Inspect carpet for large foreign material.
____Apply cleanser with mop.
____Vacuum carpets.

The strategies of occupational analysis have been presented as a process that an individual could accomplish. While an individual could conduct an analysis of an occupation it should be pointed out, that more people should be utilized. When analyzing jobs for performance it would be better to utilize the expertice of more than one experienced subject matter expert. Once the analysis process proceeds it would also be advantageous to use consultants to work with the subject matter experts. These consultants could represent the related content discipline. When using related content consultants, care must be exercised to insure the proper inputs of these consultants. The related content consultants should help the subject matter experts identify principles and concepts (as related to each task) once the subject matter experts have described what performance is necessary for task completion.

(TASK STATEMENT)

APPENDIX – OCCUPATIONAL ANALYSIS WORKSHEET

TOOLS, EQUIPMENT, MATERIALS, OBJECTS ACTED UPON	PERFORMANCE KNOWLEDGE	SAFETY – HAZARD
DECISIONS	CUES	ERRORS

(TASK STATEMENT)

APPENDIX – OCCUPATIONAL ANALYSIS WORKSHEET

SCIENCE	MATH – NUMBER SYSTEMS

COMMUNICATIONS		
PERFORMANCE MODES	EXAMPLES	SKILLS/CONCEPTS

PERFORMANCE OBJECTIVES

I.S.D. WORKSHOP

“Developing and Using Performance Objectives in Curriculum Development?”

The intent of this paper is to present a working definition of performance objectives, explain their purpose and function in course planning and development, and discuss the use of an occupational analysis as a basis for deriving objectives and selecting content for instruction.

Objectives are ends or results we wish to attain. We all have personal objectives in our life that we strive to attain. Some of our objectives are short ranged, such as the objectives for participating in today’s activities. Some of our objectives are long ranged, such as the objectives we have related to the future use of the techniques we learn during this workshop. Most of us can also say that we do not always achieve all our objectives to our fullest expectations. From time to time we may renew, modify or completely change some of our life’s objectives. Our personal objectives are related to ends or results we expect to achieve individually and with the people involved in our lives. Basically our personal objectives are performance objectives in as much as they specify what we intend to accomplish through our efforts.

We would probably agree that some of our objectives are more specific than others. Perhaps three levels of specificity are represented by our various personal objectives.

The most general objectives for our personal lives might include long range goals of achieving self realization and self-fulfillment; obtaining the “good life” for our families; and developing lasting and rewarding relationship with our friends and associates. More specific intermediate objectives might include acquiring a new house in a certain location within the next year; taking a month’s vacation to travel this coming summer; or writing an article concerning our special interest or experience for publication.

If we were to determine the specific short range objectives for purchasing a new house we might list such things as obtaining the services of a real estate agent, determining the features desired in a new house, determining the cost of purchasing various models and viewing the houses that were available in the location of our interest. At this level we would be able to determine specifically what actions must be taken first, second, third, etc.

Just as the intent and scope of objectives we set for our lives give meaning and direction to our daily efforts, so can the use of objectives give meaning and direction to the efforts of our students as they strive to learn and grow in skills, knowledge and attitudes.

If we agree to this basic assumption about objectives in our personal lives we should find no problem in recognizing both the need for and the usefulness of objectives in our curriculum planning and development activities.

The basic questions to be considered here concerning the use of performance objectives in our curriculum development efforts are:

1. What are performance objectives?
2. What specific purposes do performance objectives serve which justify the time and effort required to develop them?
3. What are the bases for deriving performance or behaviorally stated objectives for curriculum development?
4. Where do performance objectives fit into the strategy being suggested at this workshop?

Each of these questions will be answered in the following sections. A series of exercises have been included to provide you the opportunity to test your skills and knowledge on developing performance objectives.

What are Performance Objectives?

Performance objectives have been given such wide coverage in recent educational literature it almost seems unnecessary to define what is meant when an educator speaks of performance objectives. However to insure a common basis for our mutual understanding the following definition is provided.

> Performance Objective: "A statement that expresses in behavioral terms the intended performance outcome for the student following a specific learning experience; a description of measurable behavior."

A well stated performance objective has three specific components.

1. A description of the performance to be exhibited by the learner.
2. The specification of the significant conditions under which the performance is to to be given.
3. The standards or criteria by which the performance will be evaluated.

Performance objectives are written at three levels of specificity as seen in Figure 1.

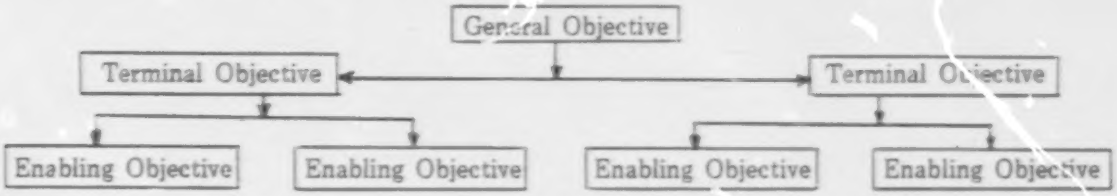


Figure 1

At the first and least specific level are general objectives which indicate the overall goals or purposes of a course. They are written to indicate the intent of the larger components of a course of study, such as the major blocks of instruction requiring the largest amount of time. General objectives should be stated in behavioral terms but they need not specify the conditions or standards for performance.

At the second level are the terminal objectives which specify logical and meaningful learning outcomes for a specific sequence of instruction. Terminal performance objectives, because of their use in evaluation, specify the performance, the conditions, and the standards. A sequence of instruction involves all the lessons and exercises required to learn the skills and knowledge related to a logical group of tasks. Terminal objectives indicate the learner outcomes for all of the tasks contained in a specific instructional sequence.

At the third and most specific level are enabling objectives which describe specific knowledge, skills and attitudes to be acquired from each instructional exercise. Enabling objectives specify the specific learning steps that lead the student from where he/she is at the start of a instructional sequence to the attainment of the terminal objectives at the end of that sequence. Enabling objectives are directly related to each individual learning exercise or lesson that make up the total sequence of instruction. The number of enabling objectives to be achieved may differ for each student depending on his or her prior knowledge or attitudes required to achieve certain terminal objectives. Adjustments in instruction must be planned by the instructor to meet such student differences and to allow each student to reach maximum learning and achievement at his/her own speed.

What are the Purposes of Performance Objectives?

Performance objectives serve several specific purposes (listed below) but they serve the general purpose of providing a basis for determining the relevance of the instruction to be provided and the content to be studied in a course. The use of performance objectives which specify the expected student outcomes in terms of measurable performance provide a basis for establishing the relevance of specific evaluation of instruction. Specifying performance objectives prevents the teacher from falling into the fallacy of a subject matter approach to curriculum planning.

More specifically, performance objectives when properly stated:

1. Establish clear and concise student learning goals.
2. Aid in the selection and organization of the most relevant course content.
3. Provide a basis for developing appropriate criterion referenced test measures.
4. Support the selection of the most suitable instructional methods and media for each learning activity.

Performance objectives are established to clarify for the students what they are supposed to learn from our instruction and how they can demonstrate that they have learned what was intended. Performance objectives which are meaningful to the students help them to understand not only the "what" of instruction but also the "why" and therefore facilitate student motivation toward learning. Well developed performance objectives relate the smaller components of instruction to the larger components of instruction so the students can see where they are headed. They can assist in giving direction to student learning efforts by helping the students establish personal learning objectives related to their interest and desires. Students can learn to guide their own learning activities by selecting experiences appropriate to their learning style and assisting in evaluating their own progress toward each objective. To achieve these benefits from the use of performance objectives requires that first, they are understandable to the student and second, that they are keyed to specific occupational tasks the student can relate to future vocational goals.

Performance objectives at the terminal and enabling level provide a basis to identify specific learner performance and developing relevant measures for evaluation. When explicit conditions and standards are specified for the expected student performance, two types of evaluation are possible. First, the evaluation of each individual student's achievement of any given objective can be determined and, second, the evaluation of the total class can be determined. The second evaluation will indicate if a sufficient number of students are achieving each objective. This last evaluation will measure the effectiveness of the instruction being provided.

When the expected student learning is specified in terms of relevant and meaningful student performance, the selection of content and its organization into learning sequence is greatly simplified. There is certain content logic in the selection and organization of content at the broad program level, but content logic is not necessarily consistent with the principles of learning when selecting and sequencing at the lesson level. The use of terminal objectives written for each task selected to be included in the course provide a specific guide for selecting and sequencing the content and instruction for the most efficient learning of each specific skill, concept, and/or attitude related to each task.

Performance objectives assist in selecting the most suitable instructional methods and media by allowing us to match the expected learner behavior with the most meaningful learning experiences that will facilitate the learner's attainment of that behavior.

There is a third idea related to the use of performance objectives which is generally given serious consideration by curriculum planners and instructors. If performance objectives identify student behavior to be exhibited when the goal of the instruction has been obtained, then we should specify objectives that will insure a well developed learner. To this end, three domains of behavior have been identified. They are the cognitive, affective and psychomotor domains.[2]

The development of the domains of performance leads us toward a taxonomy approach to writing objectives. As educators and curriculum planners we need to be certain that the objectives we specify deal with the higher levels of performance and learning and also support the development of appropriate values as well. By considering all levels of the three domains we can determine if our objectives solicit behavior from the students that goes beyond simple recall and guided performance. Figure 2 presents a simplified illustration of the three domains with definitions for each level of performance for each domain.

Level Within Taxonomy		Taxonomy	
	Cognitive	Affective	Psychomotor
High	Evaluation Synthesis Analysis	Characterization Organization Valuing	Complex Covert Response Mechanism
Middle	Application Comprehension	Responding	Guided Response Set
Low	Knowledge	Receiving	Perception

Figure 2

The use of the taxonomies to develop our learning objectives can help to plan the sequence of instruction by indicating where the lower level of objectives should precede the higher level objectives. Also the taxonomy can help to determine what content is most relevant about a task. Some tasks may require the student to learn how to perform the task (psychomotor), learn the concepts and functions of the task equipment or task product (cognitive) and also learn to value the task in relation to other tasks, such as its importance to the overall job (affective). Other tasks may not require the student to learn to perform the task but only to learn certain information about the task, such as knowing what procedures and instrument a doctor would need to perform a certain diagnostic task. (A medical assistant would not perform the task but might assist.) To work with taxonomies requires a better understanding than can be provided at this workshop. But there are many references available which are more thorough in their discussion of the taxonomy and its function. A practice exercise has been provided to allow you to test your skill at classifying objectives according to the three domains of performance.

What is a Valid Basis for Deriving Objectives?

The next question to be considered in relation to performance objectives is, "what constitutes a valid and meaningful basis for deriving objectives?" We are aware that good educational programs do not just happen and that they probably do not happen at all when the objectives and content lack a valid basis for their existance in the program. Ralph Tyler suggested the "needs of the learner," the "needs of society" and the "subject matter discipline" as three sources for deriving objectives.[2] While we recognized and recommend the importance of considering the needs of society and the needs of the learner in deriving objectives, the following section discusses an occupational analysis of specific occupations as the prime source for developing objectives and selecting relevant content for a vocational program.

A comprehensive analysis of an occupation will provide the job performance requirements in the form of information concerning the occupational role and the duties and tasks performed by the incumbent. The analysis data at duty level provides a basis for deriving the overall general performance objectives. The instruction to be developed will be directed toward achieving the general objectives. In the first planning stage we should consider the practical limitation of a secondary school program and the specific entry level requirement for first-year job performance. Such overriding constraints as time, money, facilities, student maturity, risk and liability, and instructional staff have to be considered in selecting and developing the major objectives of a course of study.

The second level of analysis data provides us with a comprehensive list of tasks organized under each duty heading. At this intermediate level between the duty level and the more specific task detail level, the specific tasks to be considered for instruction are selected and organized. We can group the tasks into small clusters as a basis for deriving terminal performance objectives and planning relevant and meaningful sequences of instruction. The strategies for selection and sequence that apply at the task level include the following:

> Select those tasks that are performed by a significant percentage of workers in the occupation.
>
> Select those tasks that are high occurrence tasks for entry level performance.
>
> Select those tasks that require considerable instruction and practice to learn.
>
> Select those tasks which are critical to future job success but have little chance of being learned on the job.

---

[2] Tyler, Ralph, Basic Principles of Curriculum and Instruction. (Chicago: University of Chicago Press 1950)

After the task have been selected that will be considered for instructional purposes the following general strategies can be applied to organize the tasks into a proposed order for instruction.

Sequence the tasks into the first or second year section of the course.

Sequence the tasks into the normal job sequence.

Sequence the tasks from the simple tasks to the more complex tasks under each duty section.

Sequence the tasks so each new skill, concept or value to be learned builds on the previous one.

Sequence the tasks into groups that can be learned in any order where there is no work order relationship between tasks.

Once the tasks have been selected and sequenced into a general order for instruction we can develop the terminal performance objectives for each task or cluster of tasks. The development of the terminal objectives is essential in further planning and in aiding the student to understand what he/she is supposed to learn about each task. Since all tasks selected may not require the same kind or amount of skills, knowledges or attitudes and may require only one or two new items of content or a part of a skill to be learned, we need to specify exactly what the student is to learn. Terminal performance objectives should also specify the conditions and standards for student performance relevant to each task since the different tasks will require differing levels of skills and different criteria for determining successful performance.

After the terminal performance objectives are developed the third level of analysis information (the task details) is used to identify in more concise terms the specific concepts, skills, and attitudes to be taught. For this third level of course planning each vocational service has adopted a format which is to be used. The formats were developed to reflect the differences in contents and organizational practices that exist between services and programs.

A review of the occupational analysis will provide categories of task information concerning the tools, equipment, and materials used: the procedures or steps to be followed; safety rules and hazards to be considered; and key decisions, cues, and errors related to the task.

From the task information listed in the analysis, specific instructional content can be identified and detailed on the provided format. This detailing must take into consideration the terminal performance the student is expected to achieve. The key question to be asked at this point is "What is relevant and meaningful about the tasks that will enable the student to reach the terminal performance required for the task?" If this question is not asked we run the chance of selecting irrelevant content or skills which need not be learned or will be soon forgotten because of disuse.

Once the basic content and skills related to the task performance categories are chosen we can examine the related academic content reported in the analysis and begin to plan for integrating it into the total course plan. When all the content is selected and organized in relation to each task to be taught each instructor can develop the enabling objectives which will relate each specific skill, concept, or attitude to a specific learning exercise or lesson. This level of objective need not be written into a course of study but is formulated as lesson plans are developed.

"Where Do Performance Objectives Fit?"

Performance objectives are derived from occupational analysis data and are ordered in a relationship to the specific components of a course study. The following section will explain and graphically illustrate the relationship between the occupational analysis, components of a course study, and the three levels of performance objectives. The analysis format and organization is based on a job taxonomy as illustrated in Figure 1.

Typical Job Taxonomy

1.0 Job — An identifiable position in a work organization.

1.1 Duties — Areas of responsibility including all the tasks to be executed by a worker in a specific job.

1.2 Tasks — Specific units of work which have definite beginning and ending points and which involves specific work behaviors that are learnable.

1.3 Task Steps — The discrete actions performed by a single worker as a chain of actions necessary to complete a single task.

Job Hierarchy

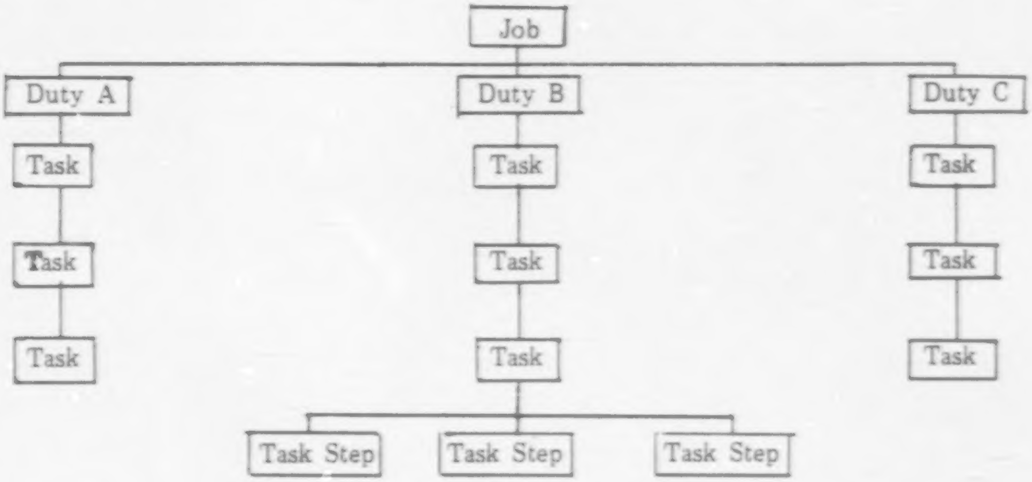


Figure 1

The components of a course of study are organized in a direct relationship to the job taxonomy levels as illustrated in Figure 2.

Components of a Course of Study

Job(s) — Total Course
Duties — Blocks
Task Clusters — Units
Task(s) — Lesson(s)
Task Step — Teaching Point(s)

Figure 2

Blocks

The major sections of a course are genrally referred to as blocks. The scope of the block would be determined by the scope of the duty to which it is related.

Units

When duties include several major subsections of tasks, the content of a related block of instruction may also be sub-divided into units to facilitate management and organization of instruction. Units of instruction should be related to clusters of tasks that might be logically taught together as a group. Grouping tasks help the learners conceptualize key relationships between the tasks. Example, "All the tasks related to measuring human vital signs might be taught as a unit to help the learner see the relationship between the various vital body functions."

Lessons

Instruction organized for a single task will generally consist of one or more specific lessons. A block of instruction and its sub-units are composed of a series of individual lessons sequenced in a teaching order. The sequence of lessons and units should be order to progress from the simple to the more complex while also moving from the concrete to the abstract. Such a sequence is illustrated in Figure 3.

Block (A.B.C.)

	Unit A	Unit B	Unit C
Simple	Lesson A1	Lesson B1	Lesson C1
to	Lesson A2	Lesson B2	Lesson C2
Complex ↓	Lesson A3	Lesson B3	Lesson C1

— Concrete to Abstract →

Figure 3

The sequence and order illustrated in Figure 3 suggests that the major blocks of instruction also be sequenced along a time frame so the more elementary content precede the more difficult.

Within a single block, units also should be sequenced to present learning in a simple to complex order and the lessons should be sequenced from the basic points to the more advanced.

In order to determine the final scope and sequence of instruction on an instructor organize the content, the skills, and the activities into a total plan for instruction.

Teaching Points

In the performance of a task there are procedural steps to be followed. In all tasks these stpes require a combination of psychomotor and cognitive activities. When a lesson is developed to teach students about a certain task it usually will involve the learning and application of both skills and knowledge. A teaching point is the smallest division of instruction designed to teach either skill, knowledge or value which is meaningful to the learner. During the task detail phase of curriculum planning many terms, facts, concepts, principles and procedures were identified for each task as relevant content for instruction.

When the individual lessons are developed they are composed of various teaching points. A teaching point, as an instructional element, must have meaning in and of itself. A single fact, concept, rule, procedure or skill may compose a single teaching point in a lesson. Teaching points answer the basic questions of "what, when, how, why, where" as they relate to the tasks content the lesson is designed to teach. The sources for identifying the teaching points for a lesson include the task analysis data, technical references, content text books, and instructor knowledge. The teaching point is the final and most specific component of a course of study.

We can now consider the relationship between the occupational analysis data, the course components, and performance objectives as they are suggested in the L.S.D. strategy. The levels of the hierarchy for each is illustrated in Figure 5.

Job	————	Course	————	Purpose and Goals
Duties	————	Blocks	————	General Objectives
Tasks	————	Lessons	————	Terminal Objectives
Steps	————	Teaching Points	————	Enabling Objectives

The planning and development of the curriculum moves down the hierarchy. The actual teaching progresses upward, starting with the lower level teaching points and enabling objectives and moving through the lessons, units, and blocks to achieve each terminal objective and general objective.

OBJECTIVE WRITING GUIDELINES AND WORKBOOK

I.S.D. WORKSHOP

This exercise has been developed to present some brief suggestions on developing performance objectives, and to provide practice in both identifying and writing performance objectives. This work book is the companion to the paper, "Performance Objectives, ISD Workshop", which has the same color cover sheet. You should read the paper to gain insight on the purpose and function of performance objectives in curriculum development as suggested in the I.S.D. strategy.

The following section presents several principles on writing performance objectives. The principles relate to each of the three components of a well-stated performance objective.

Components

1. A description of the performance expected of the student.
2. The conditions under which the performance will be given.
3. The standards by which the performance will be evaluated.

Principles

Performance:

The terminal performance should be as close as possible to the actual job performance.

The performance or action part of the objective should specify what action you will accept as a direct or indirect indicator that the student has attained the objective (skill, knowledge, attitude). A well-stated performance objective will meet four criteria.

1. It will indicate *observable* performance (behavior or behavior product).
2. It will indicate *measurable* performance (nominal, ordinal, interval, ratio).
3. It will indicate *verifiable* performance (provides evidence).
4. It will indicate *reliable* performance (not prone to varying interpretation).

Ideally, the objective performance will be tha same as the performance. However, some behaviors cannot be duplicated in the school environment for practical reasons, such as safety, cost, or environmental conditions. When job performance present such a problem, the required student performance should be as similar as possible to actual job performance.

Terminal objectives are based on the actual work tasks identified in an analysis. However, on close examination, you may find that the task involves several types of different actions described by a single verb. When such is the case, a single terminal objective may not be sufficient to specify all the skills or knowledge the student will need to learn. Any given task may support several terminal objectives in each of the taxonomies of performance (cognitive, affective, and psychomotor).

Conditions–

Principle: Performance objective conditions should match job conditions as closely as possible.

A well-stated terminal objective clearly states the conditions and/or limits under which the student will perform. These conditions should clearly define the critical factors such as equipment to be used, references or aids, space and environmental conditions, time factors, and instructions to be provided.

To determine what conditions should exist, start by considering the normal conditions which exist at the entry level of the job. The student should be able to perform under real job conditions at his/her final level of instruction, but during the beginning levels, all of the available aids, cues, guides, and instructions possible should be provided. As the student approaches mastery, the supports can be gradually withdrawn.

NOTE: One special kind of condition which should be noted is the *job aid*. They facilitate accomplishment and, if they are used on the job, it might be well to allow, even prescribe, their use in the performance evaluation.

Some of the things which make up the conditions available to the instructor are listed below.

1. Job aids
2. Equipment (real and simulated)
3. Technical references
4. Special tools
5. Environmental conditions
6. Special instruments
7. Special instructions
8. Signals, symbols, cues
9. Problem situations or contingencies (reinforcement schedules)

Standards–

Principle: Terminal objective standards should match actual job performance standards as closely as possible.

The third requirement for a well-stated terminal performance objective is a specified standard of performance.

When the student attempts to determine if he/she has attained the stated objective, there should be a standard for evaluation. In evaluating the student performance, we need a clear standard which measures the essential factors of the students' progress. If speed is essential, then the standard should specify the rate of speed or time allowed for performance. Many other factors can be important criteria for evaluating performance.

A number of suggestions which might be considered as referents for writing standards are presented below:

1. Refer to standard operating procedure.
   federal, state, local regulations and codes, logical
   sequence, procedure in manual

2. Apply the standard of no error.
   "compute the *exact* area"
   "correctly measure *all* the circuits"

3. Minimum acceptable level of performance
   "write answer to nearest tenth"
   "determine measure to .001 inch"

4. Specify the time or speed requirement
   "type letter at 40 wpm/no errors"

5. Specify the rate of production
   "complete sixty per hour"
   "repair four per day"

6. Specify qualitative requirement
   "adjust to smooth operation"
   "avoid loud talking"

RULE: When writing standards, use a quantifiable measure if possible; if not, use a qualifiable measure.

The task survey data can provide guidance on the standards that are needed. The standard is often set by the industry or profession, and can be determined by input from employers and supervisors.

When a task has no prespecified standards for performance, such as how much knowledge is required or how accurately the skill must be executed, you must set the standard. If specific information cannot be obtained, then make a "best guess." You can modify your guess as student performance is measured. The main point, is to state "how good" the students' performance must be, even if the level is an estimate. This clarifies for the student, prior to learning, what he/she must attain, and eliminates frustration and confusion over evaluation.

Two criteria for good standards are presented:

Completeness:

1. Describe the precise nature of the output.
   (What is it?)
2. Identify the number of factors the output must display.
   (How many?)
3. Specify the number of steps, and/or the sequence to be followed.
   (In what order?)
4. Indicate what proportions of the total performance is to be evaluated (How much?)

Accuracy:

1. What is the range allowed for correct performance
2. Exact number reflecting tolerances
3. Values or dimensions of acceptable types of performance

Sample Objectives

The following examples are presented to illustrate a performance objective in both its improper form and in a revised and improved form.

Terminal Objectives (cognitive)
"House Wiring"

Improper form:

–to be able to know the symbols for electrical components.

The example does not specify who will know the symbols, nor how knowledge of the symbols will be demonstrated (performance).

No conditions or standards are specified that indicate which electrical components are to be known. No standard is specified for indicating minimal level of performance.

Revised form:

–the student (learner) will identify the symbols of thirty electrical components

The revised form is better, because it specifies that this is a student objective, that the student will have to identify (not clear as to how) at least thirty electrical components (not clear as to which components or what condition will exist when they are identified).

Improved form:

> After conpleting the unit on electrical components, the student will draw the symbols for thirty common house wiring components when given each of the components.

This objective is much improved. It specifies when the student will perform (after the unit on components), how the student will identify the symbols (draw), which components (thirty common house wiring), and under what conditions (given each of the components). This objective should provide the student with sufficient information to help him/her learn what is intended. Also, by writing the objective before designing the instruction and learning activity, the instructor should be able to identify more precisely what should be taught.

The following exercises will provide you with an opportunity to test your knowledge and skill in identifying the components of performance objectives, classifying objectives according to the domains of performance, writing terminal objectives, and analyzing the objectives to design a lesson to teach the skill and knowledge required to achieve the objectives you have written. A list of sample objectives written by actual vocational teachers is provided. A list of related readings about objectives which are available at the workshop has been included. You may wish to read the references or examine them to see if they would be useful for inservice training with teachers.

TAXONOMY OF EDUCATIONAL OBJECTIVES (Adapted from Bloom, *et al*) COGNITIVE DOMAIN

Level	Title	Definition/Description	Example
Low	1. Knowledge	Recall of specifics and universals, recall of methods and processes, or the recall of a pattern, structure, or setting.	Define technical terms; give dates, names places, chronological sequences; knowledge of ways of organizing or characteristic ways of treating and presenting ideas; show knowledge of trends.
Medium	2. Comprehension	Lowest level of understanding. Individual knows what is being communicated and can make use of the rule or idea without necessarily relating it to other materials or seeing its fullest implications.	Translate, interpret, extrapolate, such "ability to read musical scores:
	3. Application	The use of abstractions in particular and concrete situations. The abstractions may be in the form of general ideas, rules of procedures, or generalize methods.	Type a block-style letter
High	4. Analysis	The breakdown of a communication into its parts so that the relative hierarchy of ideas or the relations between the ideas is clear.	Prepare an analysis of elements, analysis of relationships, or analysis of organizational principles.
	5. Synthesis	The putting together of elements so as to form a whole. This involves the process of working with pieces, parts, etc., and arranging them in such a way as to constitute a pattern or structure not clearly there before.	Produce a unique communication, a plan, proposed set of operations, or a derivation of a set of abstract relations.
	6. Evaluation	Judgments about the value of materials and methods for given purposes. Quantitative and qualitative judgments about the extent to which materials and methods satisfy criteria.	Make judgments in terms of internal evidence and judgments in terms of external evidence.

TAXONOMY OF EDUCATIONAL OBJECTIVES (adapted from Bloom, et al) AFFECTIVE DOMAIN

Level	Title	Definition/Description	Example
Low	1. Receiving	Be conscious of, take into account a situation, a phenomenon, object, or stage of affairs. Simple awareness without specific discrimination or recognition of the objective characteristics of the object. May not be able to verbalize about this awareness.	Develops awareness of aesthetic factors in dress. Develops some consciousness of color, form, or arrangement of objects. (Willingness to receive, controlled or selected attention)
Medium	2. Responding	Actively attending. Sufficiently involved in or committed to a subject or activity that he will seek it out and gain satisfaction from working with it or engaging in it.	Willingness to comply with health regulations; acquaints himself with significant current issues through voluntary reading; finds pleasure in reading for recreation.
High	3. Valuing	Attitude that a thing, phenomenon, or behavior has worth. Learner displays the behavior with sufficient consistency in appropriate situations that he comes to be perceived as Holding a value.	Continuing desire to develop the ability to speak and write effectively; examines a variety of viewpoints on controversial issues before forming an opinion; devotion to those ideas and ideals which are the foundations of democracy.
	4. Organization	Holds more than one value--organizes them into a system and sees relationships between them.	Forms judgments as to the responsibility of society for conserving human and materials resources; develops a plan for regulating his rest in accordance with the demands of his activities.
	5. Characterization-Value Complex	Individual acts consistently in accordance with his value system.	Readiness to revise judgments and to change behavior in the light of evidence.

TAXONOMY OF EDUCATION OBJECTIVES (Adapted from Simpson) PSYCHOMOTOR DOMAIN

Level	Title	Definition/Description	Example
Low	1. Perception	Becoming aware of objectives, qualities or relations by way of the sense organ.	Sensitivity to auditory cues in playing a musical instrument in a group; cue selection-recognition of operating difficulties through sound of machine; ability to relate music to dance form
	2. Set	Preparatory adjustment or readiness for a particular kind of action or experience; mental set; physical set; emotional set.	Knowledge of steps in setting the table; positioning of hands preparatory to typing; desire to operate a production drill press with skill
Medium	3. Guided Response	An overt behavioral act of an individual under the guidance of the instructor. Imitation, or trial and error.	Performing a dance set as demonstrated. Discovering the most efficient method of ironing a blouse. Determing the fastest way to collate papers.
High	4. Mechanism	Learned response becomes habitual, has confidence and some degree of skill	Ability to perform a hand-hemming operation. Ability to type straight copy materials.
	5. Complex overt response	A high degree of skill has been attained. Act can be carried out smoothly and efficiently with minimum expenditure of time and energy--resolution of uncertainty and automatic performance	Skill in operating a milling machine. Skill in performing on the violin. Ability to transcribe shorthand (which involves fusion of English, typing, and shorthand skills).

The following exercise is provided as an opportunity for you to test your knowledge of the taxonomy of behaviors and where different objectives fit in the taxonomy.

Objective

After reading the section on performance objectives and reviewing the illustrations of the taxonomies (cognitive, affective, psychomotor) you should be able to classify sample objectives into the taxonomy and level to which it belongs with no more then three errors.

Mastery of Classification

Classify each item by: (1) taxonomy to which it belongs, and (2) the level within the taxonomy.

Level Within Taxonomy	Taxonomy		
	Cognitive	Affective	Psychomotor
High	Evaluation Synthesis Analysis	Characterization Organization Valuing	Complex Overt Response Mechanism
Middle	Application Comprehension	Responding	Guided Response Set
Low	KNowledge	Receiving	Perception

	Taxonomy			Level		
	C	A	P	H	M	L
1. List the principles of salesmanship						
2. Write three examples of the logical fallacy of the undistributed middle.						
3. Players will display good sportsmanship after losing a football game.						
4. Name the bones of the body.						
5. The student is to draw his/her service revolver and fire five rounds from the hip within a period of three seconds. At 25 yards all rounds must hit the standard silhouette target.						
6. The student must be able to fill out a standard accident report.						
7. Given a list of objectives, the learner must be able to select those that are correctly written according to Mager rules.						
8. To demonstrate ability to read and assemble a blueprint, the student must make the item depicted by the blueprint given him/her at the time of examination.						

	Taxonomy			Level		
	C	A	P	H	M	L
9. Write a description of the steps involved in making a blueprint.						
10. Run a 100-yard dash in four minutes.						
11. The student is to name and give an example of each of six programming techniques useful for eliciting a correct response.						
12. To correctly identify the composition of a sample of soil and prescribe correct compounds of fertilizer for raising a soybean crop.						
13. Shorthand students will transcribe an 80-wam test at a minimum typewriting speed of 25 wam and will make no English or typing errors.						
14. Following a unit on light opera, the student will check out similar records from the school library.						
15. List the steps in proper order for setting up an IBM Composer for use in typing a three-fold bulletin.						
16. Answer 50 multiple-choice questions on the subject of legal contracts.						
17. Display courtesy to peers and instructor in all circumstances.						
18. Type 40 words a minute on a straight-copy test.						

ANSWERS

1. C L
2. C M
3. A M
4. C L
5. P H
6. C H
7. C H
8. C M
9. C M
10. P H
11. C M
12. C H
13. P H
14. A M
15. C L
16. C M
17. A H
18. P H

The following exercise is provided as an opportunity for you to test your knowledge of the components of well stated objectives.

Objective:

After reading the section on Performance Objectives you should be able to identify the three components of performance objects when given sample objects with no more than three errors.

Identification of the Components of Performance Objectives

Identify the components of the following performance objectives using these symbols:

Put brackets around the type of behavior expected.
Underline the conditions.
Circle the performance standards and/or criterion.

Check at the left the objectives that are incomplete.

1. To increase the speed and improve the endurance of eighth-grade male students so that given a stopwatch and an official, measured 440-yard track, 80 percent of the students will run one mile in less than 6 minutes by the end of the school year.

2. To improve the math skills of fourth-grade students in adding unlike fractions, as determined by Gored Test of fractions, so that out of 25 additional problems, 80 percent of the students get at least 22 out of 25 answers correct.

3. The student must be able to understand the theory of evolution. Evidence of understanding will be obtained from a written essay on evolution.

4. The student must be able to correctly name each item depicted by each of a series of 20 blueprint

5. During the final examination, and without reference, the student must be able to write a description of the steps involved in making a blueprint.

6. The student must be able to fill out a standard accident report.

7. The student is to be able to draw his service revolver and fire five rounds (shots) from the hip within a period of three seconds. At 25 yards all rounds must hit the standard

silhouette target at 50 yards he must hit with at least two of his five rounds.

8. Given a list of objectives, the learner should be able to evaluate each.

9. To develop in ninth-grade agriculture students a basic knowledge of function, composition, and properties of soil to be measured by a written teacher-made test.

10. The student will be able to saw four out of five pieces of 2 x 4 lumber to within 1/16th of an inch of the specified size.

A. FOR EACH OBJECTIVE THAT YOU CHECKED AS INCOMPLETE REWRITE SO THAT IT BECOMES COMPLETE.

✓

CRITERION REFERENCED TESTING

DEVELOPING CRITERION TEST MEASURES

After the performance objectives have been written, it is essential to specify and develop the criterion measures that will be used to evaluate post-instructional student performance. These measures will assess the success of the instruction sequence as well. As indicated in the model, the development and specification of objectives and criterion measures is a parallel and interrelated process. The basic rule that applies here is:

State the objective, teach the objective, and measure the objective.

This implies that the kinds of measures to be used should reflect the kinds of behavior stated in the objective.

Objectives:	The student will be able to correctly identify the names of 30 widely used electrical components when given a list of their symbols.
Criterion:	Given a list of 30 symbols for widely used electrical components, the student will write from recall the names of each component the symbols represent.

A criterion-referenced test exercise is an exercise based on a performance objective and is designed to determine whether or not the learner has accomplished the objective. It possesses each of the following characteristics:

Congruence – it measures behaviors specified in the objective and developed through instruction.

Comprehensibility – the performance required is clearly defined and all relevent instructions are provided.

Objectivity – the performance required can be clearly identified as correct or incorrect, sufficient or insufficient.

Integrity – the criterion is complete in content so that a person who achieves the criterion measure could accomplish other criterion measures for the same objective.

Equivalence – the measure does not demand a higher level or different type of performance than is called for in the performance objective.

Each criterion test item should be based on the performance, conditions, and standards specified in the performance objective. Criterion-referenced examinations are so named because the tests are referenced to an absolute level of achievement. That is, the criterion specifies an absolute minimum standard which must be achieved before the student's performance is certified as meeting mastery level. The achievement of this minimum level signals the learner to proceed to the next objective while failure to achieve the minimum criterion level of performance is a signal to the student to recycle through another instructional sequence. It should also signal the instructor to consider the effectiveness of the prior instructional sequence. Criterion referenced measures provide for a degree of quality control in that explicit determinations can be made about student performance. Norm referenced tests and tests which are graded on the curve indicates the student's proficiency only in relation to the group with which he/she is compared. The standard floats with the group's ability. While norm referenced tests can provide a relative standing among students, they are limited in value as a quality control measure and a device for the evaluation of the instructional system's effectiveness.

When developing criterion test items, it is advisable to develop more than one test item for each objective. We will want to measure the several types of performance which might be indicated by a signal terminal objective and its enabling objectives. While not every criterion measure will be used or will be equally important, a wider range of criterion measure will produce more effective evaluation.

Popham provides a scheme which aids in classifying criterion measures. At this point we are considering criterion measures of learner output for the purpose of measuring student learning and to control the learner's pace through the instructional sequence.

Considering learner outputs, we can divide measures into two categories:

1. Learner behavior
2. Learner product

First, let's consider learner behavior which are those things students do which will not be available for evaluation unless recorded by some external agent. Some examples might be the performance of a dive from a springboard, the pitching of a ball, or setting up and operating a machine in a specific manner. These types of behavior generally leave no observable product or results unless some measure is taken to record or judge the performance while it takes place. If student behavior is to be evaluated we need to plan its observation or recording.

Learner products (the second category) are those things which can be evaluated without special efforts. The normal types of products range from test papers and lab experimental reports, to the shop project. We can include also various types of student self-evaluation records.

Some student behaviors, such as damage or theft of materials and equipment, results in products which we may not wish to evaluate, but even so, this is a type of measure which may be used to evaluate attitudes.

We have identified two categories of learner output which we can evaluate. We can also identify two variables of conditions under which learner behavior and learner products may occur. Thest two conditions are identified as:

1. Natural conditions
2. Manipulated conditions

Under natural conditions, learner behavior might include hallway conversation, on-the-job performance, attendance at non-required events, the selections viewed on TV. Learner behavior under manipulated or contrived conditions would include performance tests, lab procedures, in-class presentations, and class discussions.

Learner products under natural conditions have seldom been used for evaluations but could provide very important information about the effect of programs on students. Some examples might include the frequent defacement of property, the number of books checked out of the library, the amount of litter left in the corridors, or the amount of wear on certain types of equipment or materials.

Learner products under manipulated conditions are the more common types of measures which educators use most often. These measures include scores on teacher-made tests, assigned essays, evaluation of shop projects, scores on achievement test and ratings by students on various scales.

In attempting to develop criterion measures from our objectives, we can find help from Robert Mager who provides several simple rules and cues for relating objectives and criterion.

I. "If objectives are descriptions of intended outcomes and standards we would like students to achieve, then criterion test items are used to find out if those objectives were achieved."

II. "Sometimes the criterion item looks much like the objective," for example:

Objective:	Fix a flat tire.
Criterion:	Here are some tools and a flat tire, fix it.

Other times the criterion may look quite different:

Objective:	Solve word problems
Criterion:	Sam is half as old as John; John is three years older than George. George will be 15 years old next Monday. How old is Sam?

Given this rather brief exposure to several of the concepts of criterion measures let's attempt to write a sample of several measures which would be relevant in your special area.

Performance Objective Activity

1. Select one of the duty sections in the analysis you are working with and write it in the space below.

Duty ____

____

____

2. Select a logical and meaningful group of task which are part of the above duty. Write them in the space below.

Task

1. ____
2. ____
3. ____
4. ____

3. For one or more of the tasks you have selected, you are to write two terminal performance objectives in each of the domains of behavior. These objectives should contain the three components of a well stated objective.

Terminal Performance Objectives (Performance, conditions, standard)

Cognative: (knowledge)

1.

2.

Affective: (attitude)

1.

2.

Psychomotor (motor skill)

1.

2.

4. Choose one of the terminal objectives you have written above and identify the enabling skills or knowledge a student would need to achieve the objectives to the standard you have set.

Terminal Objectives of your choice:

____

____

____

Enabling Skills Needed (list most important)	Enabling Knowledges Needed (list most important)
1.	1.
2.	2.
3.	3.
4.	4.

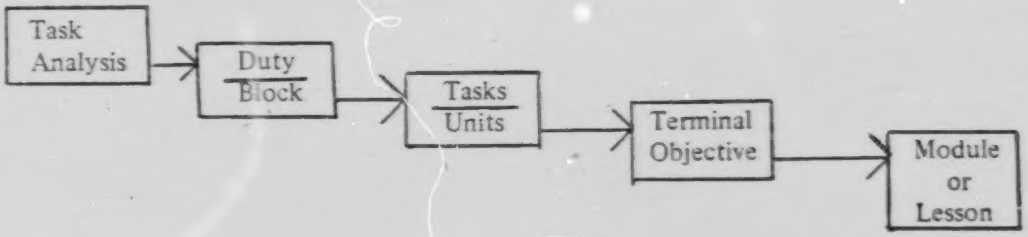
5. For the terminal objective for which you have just listed the enabling skills and knowledges you are to write a criterion referenced test measure. Your test should require the student to demonstrate the behavior required in the objective. Indicate the conditions and standards for the test measure. You may wish to list several levels of standards that could be related to a grade scale. Will you test learner performance or the product of learner performance? What activity is appropriate to demonstrate mastery of the objective?

Criterion Test Measure

Your Objective: ____________________

Your Criterion Measure: ____________________

Now that you have developed a performance objective and a criterion measure for the same tasks, your next assignment is to develop a learning module that would teach the enabling skills and knowledges you listed for your objective. You are are to develop only one module. More than one module might be required to teach all of the enabling skills or knowledges you listed. A general format is provided as a guide for developing the module. Your modules should relate back to the task analysis, course study, task details and terminal objective so that a clear understanding of the flow and sequence can be seen by other teacher. The following schematic illustrates the suggested flow from the analysis to a course of study to lessons or modules.



An individualized learning module usually contains the following items.

1. Module content outline
2. Instruction to the student
3. A pre-test
4. Information resources
5. Learning activity
6. Post-test
7. List of all resources
8. Directions for enrichment

Learning Activities

You may use several sheets of paper to prepare your sample module.

Because your objective may not lend itself to an individualized learning module you may approach this assignment as the development of a lesson. The key point and your main objective is to illustrate how other teachers can move from the course of study components to a lesson or module. Without this last step being clearly illustrated with a sample lesson or module there may be confusion in the minds of other teachers who try to adopt the process.

The following format is suggested as a guide for planning a lesson or learning module. The questions are provided to guide your planning and development of the module. You may outline those areas that would require extensive writing or where related text material would be used.

Module Title

Subject_______________

Page________

Purpose of Module (what is the content area?)

Objective: What is the student supposed to learn from the module and how will the student demonstrate achievement of the objective?

Information: What content information will be provided to the student to help him/her achieve the objective?

Activities: What activities will the student be involved in that will provide for meaningful learning?

Test Items: What test items will be used as a pre-test; post-test to determine if the student has learned the intended knowledge or skill?

Resources: List the related resources a student could use to achieve the module objective. Not all resources need to be contained in the module.

✓

TASK SURVEY INDEX

The task survey section of this workshop contains ten modules which present specific instructions on how to conduct a task survey, two survey reports which contain the procedures used and data obtained from the surveys, and a task survey strategy evaluation sheet which is intended to help you synthesize and discuss the strategies presented and how they can be implemented.

Each module listed below contains a short descriptive paragraph of the contents of each module, a performance objective, reading resources, exercise activities and feedback for those activities. The modules are sequenced in logical order and should be read in that order. Take into consideration your background and needs to decide which modules will be most useful to you. Not everyone will want to study all the modules or master them to the same degree of competency. Pick and choose from the following modules to meet your personal needs and interest:

Part A: Rationale for Use of Task Surveys

Part B: Developing a Task List

Part C: Determining Relevant Questions

Part D: Identifying the Population

Part E: Select the Sample Size

Part F: Selecting Sampling Methods

Part G: Developing the Survey Packet

Part H: Distributing and Collecting the Survey Packet

Part I: Calculating Summary Statistics

Part J: Interpreting the Data

A Survey of Certified Dental Assistants

A Survey of Medical Assistants and Physicians Who Employ Medical Assistants

Task Survey Strategy Evaulation

TASK SURVEY STRATEGY EVALUATION

PERFORMANCE OBJECTIVE

After reading the modules on task survey techniques and the two case studies presented, the workshop participants will discuss the following questions in a group and produce written feedback about each question.

1. Compare the data presented in both studies. How could you use this data in course development?

2. What limitations and advantages should you be aware of in each study? (i.e., characteristics of population sampled, sampling methods, background information, survey format, questions asked, etc.)

3. Assuming the data was valid, what decisions could you make based on this data and strategies suggested for analyzing the data?

4. Do you think the task survey process is a valid means of obtaining data for curriculum development? Why or why not?

5. Do you think task surveys can be implemented effectively at the local level? Why?

6. Would you implement a task survey process in your school systems? Who would be responsible for it? What would be its purpose?

7. If you had a task survey process in your school systems, what kinds of data would be most useful to you in the curriculum development process? What kinds of questions would you ask? Who would you survey?

A SURVEY OF CERTIFIED DENTAL ASSISTANTS

Conducted by I.M.L.

1973

INTRODUCTION

A survey of Certified Dental Assistants was undertaken as part of the E.P.D.A. Occupational Analysis Project. It was conducted during September and October of 1973 by the project staff at the T & I Instructional Materials Laboratory. Its main objective was to develop, field test and validate a standard survey procedure to be used later in extensive task surveys. Conducting this survey helped establish standard in-house procedures and in-service training for personnel to be involved in future surveys. The dental assistant survey provided an estimate of time and cost involved in conducting a task survey. A second objective was to provide data for use in the analysis of the Dental Assisting occupation to take place in the Occupational Analysis Workshop held during the summer of 1974.

PROCEDURES

Development of the Task List

The task list used in the survey instrument was developed from a suggested course outline in Dental Assisting published by the IML in 1970. The course outline was developed by a panel of nine dental assisting instructors and educational personnel.

Activity statements were taken directly from the outline and clustered under the following duty headings: Chairside Assisting; Chairside Assisting, Specialities; Radiology; First Aid; Microbiology and Sterilization; Dental and Lab Materials; Pharmocology; and Office Management. All statements referring to classroom activities were deleted. The remaining activity statements were reworded to fit a standard task language. The result was a list of tasks stated in behavioral terms that described the activities a Dental Assistant performs on the job.

Design of the Survey Instrument

The survey instrument consisted of six pages of task statements listed under the duty headings. Each respondent was asked to answer the questions of "How often do you perform this task?" and "How important is the correct performance of this task for job success?" The respondents were to indicate their judgments by checking one of three answers for each question. Frequency of performance was divided into subcolumns labeled "Seldom," "Occasionally," and "Frequently." Importance of performance was divided into subcolumns labeled "Slight," "Moderate," and "Great."

These two categories of information were selected on the basis of a review of the literature including suggestions from "Process and Techniques of Vocational Curriculum Development" edited by Smith and Moss, published in April 1970 by the Minnesota Research Coordinating Unit. It was felt that the data from these two questions would provide usable information. These questions would indicate the tasks most common to all Dental Assistants, the tasks most often performed, the tasks most often performed by the greatest percentage of workers, and the tasks most critical to occupational success.

The survey instrument was prefaced with a cover letter giving background information on the survey and project. Also included was an instruction sheet giving directions for completing the survey instrument. See Appendix A for examples of all the survey materials.

Survey Population

The survey population was defined as all Certified Dental Assistants who were members of the Ohio Dental Assistants Association. No uncertified Dental Assistants or non-members of the O.D.A.A. were included in the population. Ms. Marjorie J. Dolkowski, president of O.D.A.A. in 1973, supplied a list of 154 certified members and their addresses. One hundred fifteen people constituting 75 percent of the population were randomly selected for inclusion in the survey sample. Sixty-five people constituting 57 percent of the sample and 42 percent of the population returned the surveys. No background information was gathered except for facts volunteered by respondents concerning the type of institution or position in which they worked. The lack of background information limited the analysis of data and indicated the need for such data in any future surveys.

DATA ANALYSIS

The data presented in the section titled, "Report of the Data" is the data collected from the Certified Dental Assistants who were members of the Ohio Dental Assistant Association. Because of the limited response and the small smaple size, caution is advised in attempting to draw any conclusions from the data. It is provided strictly as an example and does not necessarily represent the total population of Dental Assistants in Ohio.

The data is reported in the following manner. The task statements are listed on the left side of the page in the order they appeared on the task inventory. The right side of the page is divided into two regions. The data on frequency of performance occupies the first five columns and the data on importance of performance occupies the next five columns. See Figure 1.

TASK INVENTORY DENTAL ASSISTANT	Never	Seldom	Occas.	Freq.	Average	None	Slight	Mod.	Great	Average
Dental and Lab Materials										
1. Mix zinc oxide-eugenol for base and temporary	1	1	8	55	2.80	3	1	7	54	2.72

The data for frequency of performance is reported in columns labeled "Never," "Seldom," "Occasionally," "Frequently," and "Average." The first four columns contain the number of responses indicated on the returns in those columns for each task. The fifth column contains the relative mean value derived for each task for the frequency of performance. The data for frequency of performance reported in Figure 1 is read as follows:

Column 1 — One person indicated he/she never performed the task

Column 2 — One person indicated he/she seldom performed the task

Column 3 — Eight people indicated they occasionally performed the task

Column 4 — Fifty-five people indicated they frequently performed the task

The data for importance of performance is reported in the next five columns in the same manner as frequency, except the first four columns are labeled: "None," "Slightly," "Moderate," and "Great." Looking again at Figure 1 the reported data under importance can be read in the following manner:

Column 1 — Three people rated the task as having no importance to their job success

Column 2 — One person rated the task as having slight importance

Column 3 — Seven people rated the task as having moderate importance

Column 4 — Fifty-four people rated the task as having high importance

The fifth column contains a relative mean value for each task for the question of importance. The relative mean value of a task for any question is a single number that facilitates the ranking and reordering of tasks in relation to all other tasks. To calculate a relative mean value for each of these tasks, these procedures were followed:

1. A numerical value was assigned to each response for each question.

Frequency	Importance
0 - Never	0 - None
1 - Seldom	1 - Slight
2 - Occasionally	2 - Moderate
3 - Frequently	3 - Great

2. The value of each response column was multiplied times the number of responses reported in that column for one task.
3. The products obtained in step 2 were added.
4. The sum of the products were divided by the total number of responses returned.

EXAMPLE: To find the relative mean of frequency for the previous task example multiply the column value times the number of responses reported in that column for that task:

Column	Value	X	No. of Responses	=	Product
Never	0		1		0
Seldom	1		1		1
Occasionally	2		8		16
Frequently	3		55		165
			65		182

Add the products (sum=182.) Divide the sum by the total number of responses: 182 ÷ 65 = 2.80. 2.80 is the relative mean value for that task for frequency of performance.

To find the relative mean value of importance for the previous example go through the same procedure using the data from the second section that contains the totals for importance. Again multiply the column values times the number of responses reported in that column for that task:

Column	Value	X	No. of Responses	=	Product
None	0		3		0
Slight	1		1		1
Moderate	2		7		14
High	3		54		162
			65		177

Add the products (sum = 177). Divide that sum by the total number of responses: 177 ÷ 65 = 2.72. 2.72 is the relative mean value for importance for that task.

This procedure is repeated for each task for each question. Once the relative mean value is determined it is easy to rank the tasks from highest to lowest values. Table 1 is an example of reordered tasks under the duty "Dental and Lab Materials." They are ranked from most frequently performed tasks to the least frequently performed tasks according to their relative mean values for frequency.

Table 1

Dental and Lab Materials

Mean Value	Task No.	Task Statement
2.80	1	Mix zinc oxide-eugenol for base and temporary
2.80	3	Mix amalgam for restorative purposes
2.71	2	Mix zinc phosphate for temporary; cementation; base fillings
2.62	9	Mix alginate to take an impression
2.46	16	Mix rubber base and load syringe for impression
2.45	11	Pour a plaster mold
2.42	12	Pour a stone model
2.38	4	Mix silicate for restorative purposes
2.38	5	Mix resin for restorative purposes
2.31	6	Mix acrylic for restorative purposes
2.29	13	Trim a stone and plaster model
2.26	14	Make a partial and complete impression tray (custom)
1.98	10	Box an impression
1.92	19	Prepare compounds for impressions
1.89	17	Mix silicones for impression
1.88	21	Construct wax rims
1.80	15	Mix metallic zinc oxide base for an impression
1.80	20	Construct a base plate
1.75	7	Prepare gutta percha for temporary fillings
1.69	8	Select and bead trays
1.60	22	Articulate models
1.57	18	Prepare hydrocolloid for an impression
1.57	27	Construct an acrylic temporary crown
1.40	23	Carve wax patterns
1.35	24	Sprue and invest wax patterns
1.29	26	Clean and polish wax patterns
1.18	25	Cast wax pattern

FINDINGS AND CONCLUSIONS

The survey accomplished its first objective of developing and field testing a survey process and determining time and cost factors.

The process consisted of three phases:

1. constructing a task inventory
2. acquiring information about each task
3. analyzing the task data

This process was field tested and standardized. As a result of this survey I.M.L. personnel were trained in this process and procedures were implemented to smooth the mechanics of the process. Task language and rules of construction were standardized. General formats were developed for the task inventory, cover letter, and instruction sheet. Printing schedules, collating, mailing, filing and tabulating were refined. Basic statistics and analysis procedures were tested. This provided a basic procedural model for future surveys. Time and cost factors were determined for budget purposes. The expenses of composition, printing, miscellaneous labor and supplies are listed below:

Composition time (10 hours)	$50.00	
Printing (paper and time)	11.50	
Miscellaneous labor	38.00	
Mailing envelopes (115 @ $.16)	18.40	
Return envelopes	.60	
Initial postage (115 @ $.16)	18.40	
Return stamps (115 @ $.08)	9.20	
Total	146.10	$146.10 ÷ 63 = $.43 cost per return

The second objective was to provide data for use in the analysis of the Dental Assisting occupation to take place in the Occupational Analysis workshop held during the summer of 1974. Some problems were encountered during the survey process which prevented the collecting and reporting of totally accurate and valid data. Caution must be taken not to generalize the results of the survey to all Dental Assistants in Ohio. This particular survey lacked background data. The only characteristics known about the respondents are that they were Certified Dental Assistants and members of the Ohio Dental Assistant Association. There is no way to know how representative this sample is of all Dental Assistants in Ohio.

The contents of the task list was validated. The questions asked about each task, however, were too general and the response scale too narrow to obtain sufficient discrimination between tasks to enable concise decisions. On the instruction sheet, the respondents were asked to check one of the three subcolumns which expressed their judgment of "how often the task is performed" and "how important the correct performance of the task is for job success" compared to all other tasks. No criteria, explanation, or examples as a reference for the respondents' "judgment" was given. Consequently the responses indicated in each subcolumn can be interpreted only in a relative fashion. For example: One respondent might have thought that a task performed weekly was frequently performed and marked that column on the survey. Another respondent might have thought that a task that was performed weekly was only performed occasionally. The use of more specific and self explanatory terms such as "several times a day," "daily or several times a week," "weekly or several times a month," as possible responses to the question or frequency of performance would have yielded more accurate and usable data.

The use of only three possible responses to each question also limited the data. Such a narrow scale as this did not provide enough choices for each respondent to discriminate accurately between tasks, especially in evaluating the tasks for importance. If the task was performed by the respondent, it was usually given a rating of at least "Moderate" importance. There was no way to discriminate between the tasks that fell between the two judgments of moderate or highly important. Since these terms were not explained, or examples given, it is impossible to interpret how close each respondent's concept of slight, moderate and high importance was to each other. As a result of these observations a more discriminating and specific five point scale was used on all of the following surveys.

Another major problem encountered in this survey was control over the accuracy of the tabulation. As a result of poorly marked surveys, counting the responses was very difficult and the totals and averages reported are not completely accurate. The section on the duty "Dental and Lab Materials" was retallied and the statistics refigured, so the examples used in this report are accurate. While some totals vary, the differences on the recount was usually at the second decimal place.

In summary, this survey contained several weaknesses: lack of background data, lack of accurate explanation or examples for the questions asked about each task, poor discrimination between tasks because of limited response choice, and difficulty in tallying the responses. These weaknesses became apparent during the survey process and analysis of survey data. As a result of this study, corrections and improvements were made to the process and implemented in all future surveys.

Report of Data

TASK INVENTORY DENTAL ASSISTANT	Frequency of Performance					Importance of Performance				
	Never	Seldom	Occass.	Freq.	Average	None	Slight	Mod.	Great	Average
Chairside Assisting										
1. Open dental office	0	3	7	65	2.83	0	2	17	46	2.68
2. Preparation of operatories	0	1	2	73	2.95	0	1	6	74	2.90
3. Operate chair	0	3	13	62	2.76	0	3	14	59	2.74
4. Operate dental unit	0	11	16	52	2.52	0	7	14	50	2.61
5. Greet patient	0	0	9	69	2.88	0	0	4	72	2.95
6. Seat patient	0	2	7	69	2.86	0	1	10	61	2.83
7. Set up and assist for an examination	0	2	4	53	2.86	0	0	3	50	2.94
8. Chart using the universal method	1	9	8	43	2.52	1	4	8	46	2.68
9. Chart using Bosworth method	2	18	8	29	2.20	2	9	11	23	1.75
10. Chart using Palmer's method	2	22	6	26	2.00	2	11	17	27	2.21
11. Set up and assist with Flouride treatment	1	15	20	24	2.12	1	6	31	24	2.26
12. Set up and assist with prophylaxis	1	14	11	38	2.32	1	5	14	33	2.49
13. Use dental floss	1	11	18	35	2.34	1	3	6	34	2.66
14. Demonstrate toothbrushing	0	4	17	40	2.59	0	0	6	46	2.88
15. Set up and assist with local anesthetic	0	4	10	50	2.72	0	2	8	49	2.80
16. Retract tongue and cheeks	0	6	8	46	2.67	0	4	4	54	2.81
17. Use and clean the oral evacuator	0	2	7	52	2.82	0	0	5	52	2.91
18. Pass and receive instruments with one hand and with two hands	0	3	6	51	2.80	0	1	6	29	2.78
19. Set up and assist with an amalgam procedure	0	1	5	37	2.84	0	1	7	45	2.83
20. Set up and assist with the placement and removal of rubber dam	0	13	22	30	2.26	0	4	21	26	2.43
21. Set up and assist with amalgam polish	0	18	16	29	2.17	0	9	13	35	2.46
22. Set up and assist for a porcelain procedure	0	5	9	47	2.69	0	1	12	41	2.74

TASK INVENTORY DENTAL ASSISTANT	Frequency of Performance					Importance of Performance				
	Never	Seldom	Occass.	Freq.	Average	None	Slight	Mod.	Great	Average
Chairside Assisting (cont.)										
23. Set up and assist with a porcelain procedure	0	16	12	32	2.27	0	9	19	23	2.27
24. Set up and assist with a gold foil procedure	0	35	9	13	1.61	0	17	14	24	2.13
25. Set up and assist for an indirect gold inlay pup	0	17	12	29	2.33	0	7	9	34	2.54
26. Set up and assist with cementing a gold inlay	0	10	10	38	2.48	0	4	5	50	2.78
27. Clean operatory after a procedure	0	0	5	58	2.92	0	2	4	53	2.86
28. Drain and lubricate the air compressor	1	19	18	25	2.06	0	10	26	25	2.25
29. Take apart, clean and lubricate a conventional right angle handpiece	0	4	18	39	2.57	0	3	13	36	2.63
30. Take apart, clean and lubricate a prophy angle	1	4	13	40	2.59	0	2	7	48	2.81
31. Take apart, clean and lubricate a conventional straight handpiece	0	5	13	42	2.62	0	2	13	43	2.71
32. Change the chuck in a high speed handpiece	0	16	16	27	2.19	0	6	14	34	2.52
33. Clean and wax the dental unit	0	11	24	29	2.28	0	7	17	36	2.48
34. Oil the dental engine	0	17	21	27	2.41	0	8	17	33	2.43
35. Clean and oil the pullies on the engine arm	0	16	19	26	2.16	0	8	15	34	2.46
36. Change the engine belt	3	20	25	16	1.84	1	9	22	30	2.31
37. Arrange instruments in the operatory cabinets	0	3	15	47	2.68	0	1	21	42	2.64
38. Color code instruments	0	28	20	13	1.75	0	22	21	18	1.93
39. Change the bulb in the unit lamp	0	28	30	36	2.09	0	16	27	20	2.06
40. Close the office	0	3	10	53	2.76	0	2	13	50	2.74

TASK INVENTORY

DENTAL ASSISTANT

		Frequency of Performance					Importance of Performance				
		Never	Seldom	Occass.	Freq.	Average	None	Slight	Mod.	Great	Average
	Chairside Assisting, Specialities										
1.	Set up for crown and bridge preparation	0	6	6	51	2.71	0	1	4	58	2.76
2.	Assist with a crown and bridge preparation	0	6	6	52	2.72	0	1	5	56	2.89
3.	Set up and assist with a bridge tryin	0	11	9	44	2.52	0	7	12	44	2.59
4.	Set up and assist for seating a bridge	0	7	6	52	2.69	0	2	9	53	2.80
5.	Set up and assist for the first denture procedure	1	3	11	51	2.70	1	2	9	51	2.75
6.	Set up and assist for the second denture procedure	1	4	11	48	2.66	1	2	12	48	2.70
7.	Set and assist for the third denture procedure	1	7	12	44	2.55	1	7	12	43	2.54
8.	Set up and assist for the fourth denture appointment	1	8	13	41	2.49	1	7	15	40	2.49
9.	Set up and assist for the fifth denture appointment	1	10	8	43	2.50	1	10	14	38	2.41
10.	Set up and assist for the first partial denture appointment	1	4	8	51	2.70	1	4	6	51	2.73
11.	Set up and assist for the second partial denture appointment	0	7	12	45	2.59	0	5	12	[illegible]	2.65
12.	Set up and assist for the third partial denture appointment	0	11	15	42	2.46	0	10	14	38	2.45
13.	Set up and assist for a periodontal scaling and subgingival currettage	0	11	24	28	2.27	0	4	20	40	2.56
14.	Set up for a gingivectomy	0	17	23	23	2.10	0	5	15	43	2.60
15.	Mix periodontal pack	0	21	23	21	2.00	0	12	13	37	2.40
16.	Prepare patient for surgery	0	12	17	35	2.36	0	6	9	47	2.66
17.	Prepare self for surgery	0	12	20	31	2.30	0	6	10	45	2.64
18.	Use surgical aspirator	0	9	20	36	2.42	0	5	12	45	2.65
19.	Assist with a gingivectomy	0	19	18	25	2.20	0	6	15	38	2.54
20.	Clean surgical aspirator	0	10	19	34	2.38	0	5	13	42	2.62

TASK INVENTORY

DENTAL ASSISTANT

Chairside Assisting, Specialities (cont.)

	Frequency of Performance					Importance of Performance				
	Never	Seldom	Occas.	Freq.	Average	None	Slight	Mod.	Great	Average
21. Consult patient about proper diet	0	22	21	22	2.00	0	13	19	30	2.27
22. Sharpen periodontal instruments	0	37	11	13	1.61	0	14	20	25	2.19
23. Set up and assist with pack removal	0	25	18	18	1.89	0	11	19	27	2.28
24. Set up for the removal of maxillary teeth	0	12	14	36	2.85	0	6	12	42	2.60
25. Assist with the removal of the maxillary teeth	0	10	11	39	2.48	0	7	9	45	2.62
26. Set up and assist with removal of manidibular teeth	0	12	12	38	2.42	0	7	9	45	2.62
27. Prepare sutures	0	12	17	36	2.37	0	8	15	40	2.63
28. Set up and assist with suture removal	0	12	22	31	2.29	0	11	15	36	2.40
29. Set up and assist with treatment for dry socket	0	18	19	22	2.07	0	14	11	37	2.37
30. Set up and assist with the removal of impacted teeth	0	21	39	26	2.06	0	11	8	42	2.51
31. Set up and assist with an alveolectomy	1	25	16	23	2.03	0	14	4	41	2.46
32. Set up and assist with tori removal	1	34	16	6	1.79	1	12	13	27	2.13
33. Set up and assist with a biopsy	1	30	18	8	1.58	1	11	13	30	2.31
34. Take a blood pressure	3	36	13	7	1.41	3	18	12	24	2.00
35. Take an oral temperature	3	37	15	5	1.37	3	17	15	21	1.96
36. Set up and assist with the diagnosis of an endodontic Patient	1	7	18	35	2.43	1	6	14	36	2.49
37. Set up and assist with cavity preparation and reaming a root canal	2	5	13	44	2.55	2	1	10	49	2.71
38. Set up and assist with irrigating cultures and disenfecting a root canal	1	13	8	42	2.42	1	5	6	50	2.69
39. Set up and assist with canal abturation	1	11	12	36	2.38	1	2	9	43	2.71

TASK INVENTORY DENTAL ASSISTANT	Frequency of Performance					Importance of Performance				
	Never	Seldom	Occass.	Freq.	Average	None	Slight	Mod.	Great	Average
Chairside Assisting, Specialities (cont.)										
40. Set up and assist with a pulpotomy	1	12	26	24	2.16	1	5	13	40	2.56
41. Set up and assist with an apicoectomy	1	22	19	17	2.22	1	6	14	34	2.47
42. Set up and assist with a chrome crown procedure	1	22	17	19	1.92	1	8	19	26	2.30
43. Set up for the fabrication of a space maintainer	2	22	21	15	1.82	2	11	17	28	2.22
44. Assist with the fabrication of a space maintainer	3	25	19	14	1.72	3	11	17	24	2.13
45. Set up and assist with the diagnosis of an orthodontic patient	5	21	17	15	1.72	4	15	11	21	1.96
46. Prepare and trim orthodontic models	4	25	11	16	1.70	3	9	11	25	2.21
47. Set up for the banding appointment	6	27	12	11	1.50	4	10	13	23	2.10
48. Size orthodontic bands	6	31	10	8	1.36	3	13	13	20	2.02
49. Weld or solder brackets to orthodontic bands	6	34	9	8	1.41	3	12	15	19	2.02
50. Set up and assist with the removal of orthodontic bands	6	28	9	13	1.52	3	10	15	21	2.10
51. Process an acrylic retainer	5	33	12	7	1.37	3	11	18	19	2.04
52. Consult patient on do's and don't's while wearing orthodontic appliances	6	19	15	17	1.75	3	7	14	27	2.27
Radiology										
1. Demonstrate how the component parts of an X-ray unit work	1	31	12	13	1.65	1	13	17	22	2.13
2. Seat the patient	0	1	8	55	2.84	0	3	10	48	2.74
3. Consult with patient on the importance of X-rays	0	7	13	42	2.56	0	5	5	49	2.75
4. Place X-rays for short cone technique	1	10	6	43	2.52	0	3	7	45	2.77
5. Place cone tip for the short cone technique	1	10	7	38	2.47	0	2	7	41	2.78
6. Place X-ray for the long cone technique	4	17	8	29	2.07	1	4	8	38	2.63

TASK INVENTORY

DENTAL ASSISTANT

	Frequency of Performance					Importance of Performance				
	Never	Seldom	Occas.	Freq.	Average	None	Slight	Mod.	Great	Average
Radiology (cont.)										
7. Place cone tip for long cone technique	4	16	10	28	2.07	1	4	8	40	2.65
8. Expose film	1	2	8	50	2.76	0	0	6	51	2.90
9. Process film	1	1	3	56	2.87	0	0	3	53	2.95
10. Mount films	0	3	5	55	2.83	0	1	5	54	2.89
11. Clean and prepare the developing tank	0	3	11	49	2.73	0	0	10	51	2.84
First Aid										
1. Treat patient for shock	1	42	10	8	1.41	1	5	7	43	2.65
2. Treat patient for hemorrhage	2	33	18	6	1.48	2	7	6	38	2.51
3. Treat patient for respiratory failure	2	39	12	5	1.35	2	7	5	39	2.53
4. Treat patient for foreign body in eye and throat	14	49	6	2	.95	15	10	11	25	1.76
5. Treat patient for minor burns	16	49	5	1	.88	7	15	11	18	1.79
6. Treat patient for minor wounds	14	49	6	2	.95	16	14	13	18	1.54
7. Treat patient for convulsions	12	48	9	2	1.02	12	6	10	33	2.05
8. Treat patient for cardiac arrest	16	48	4	3	.96	15	4	7	35	2.02
9. Treat patient for various injuries	16	37	7	2	.92	18	8	11	24	1.68
10. Treat a patient for poison	18	37	4	2	.84	19	10	9	23	1.59
Microbiology and Sterilization										
1. Use a microscope	15	35	10	1	.95	18	22	10	11	1.23
2. Make a culture media	13	37	7	4	1.04	16	15	15	15	1.48
3. Take culture	12	32	13	4	1.15	15	10	16	21	1.70
4. Clean and prepare the autoclave	4	3	9	45	2.56	6	0	7	48	2.59

TASK INVENTORY DENTAL ASSISTANT	Frequency of Performance					Importance of Performance				
	Never	Seldom	Occas.	Freq.	Average	None	Slight	Mod.	Great	Average
Microbiology and Sterilization										
5. Scrub and sterilize instruments for autoclave	3	3	3	56	2.72	5	0	6	55	2.72
6. Wrap and pack instruments for autoclave	4	4	6	51	2.58	6	0	6	54	2.68
7. Clean container, prepare chemicals for sterilization	0	4	9	52	2.74	3	1	4	57	2.74
8. Prepare, sterilize instruments for chemical sterilization	3	2	4	56	2.74	5	1	3	56	2.69
9. Prepare, sterilize instruments in hot oil	14	29	4	18	1.40	18	11	14	22	1.61
10. Prepare, sterilize instruments in boiling water	13	34	6	12	1.26	13	20	8	24	1.66
11. Prepare, sterilize instruments in dry heat and alcohol	9	17	8	31	1.94	12	7	10	36	2.08
12. Prepare, sterilize instruments using ultrasonic	7	10	13	35	2.17	11	3	12	35	2.03
13. Store surgery instruments	2	6	8	49	2.60	5	4	10	46	2.49
14. Store operative instruments	0	2	4	59	2.88	0	2	7	56	2.83
Dental and Lab Materials										
1. Mix zinc oxide-eugenol for base and temporary	1	1	8	55	2.80	3	1	7	54	2.72
2. Mix zinc phosphate for temporary; cementation; base fillings	1	3	10	51	2.71	4	1	6	54	2.69
3. Mix amalgam for restorative purposes	3	1	2	59	2.80	5	0	2	58	2.74
4. Mix silicate for restorative purposes	6	7	8	44	2.38	8	1	6	50	2.51
5. Mix resin for restorative purposes	5	7	11	42	2.38	9	2	4	50	2.46
6. Mix acrylic for restorative purposes	4	10	13	38	2.31	8	3	6	48	2.45
7. Prepare gutta percha for temporary fillings	8	18	21	18	1.75	13	7	15	30	1.95
8. Select and bead trays	7	21	22	15	1.69	11	7	16	31	2.03
9. Mix alginate to take an impression	2	6	7	50	2.62	8	2	7	48	2.46
10. Boxing an impression	4	21	12	28	1.98	8	8	15	34	2.15

TASK INVENTORY DENTAL ASSISTANT	Frequency of Performance					Importance of Performance				
	Never	Seldom	Occass.	Freq.	Average	None	Slight	Mod.	Great	Average
Dental and Lab Materials (cont.)										
11. Pour a plaster mold	3	8	11	43	2.45	6	2	9	48	2.52
12. Pour a stone model	6	5	10	44	2.42	8	2	6	49	2.48
13. Trim a stone and plaster model	7	8	[illegible]	41	2.29	8	5	8	44	2.35
14. Make a partial and complete impression tray (custom)	3	14	11	37	2.26	7	4	11	43	2.38
15. Mix metallic zinc oxide base for an impression	9	15	21	20	1.80	11	7	13	34	2.08
16. Mix rubber base and load syringe for impression	5	4	12	44	2.46	7	2	6	50	2.52
17. Mix silicones for impression	8	16	16	25	1.89	9	4	16	36	2.22
18. Prepare hydrocolloid for an impression	11	22	16	16	1.57	12	8	17	28	1.94
19. Prepare compounds for impressions	6	18	16	25	1.92	9	9	15	32	2.08
20. Construct a base plate	11	15	15	24	1.80	11	6	12	36	2.12
21. Construct wax rims	10	15	13	27	1.88	10	9	10	36	2.11
22. Articulate models	10	25	11	19	1.60	11	10	10	34	2.03
23. Carve wax pattern	11	27	17	10	1.40	15	12	16	26	1.88
24. Sprue and invest wax patterns	12	30	11	12	1.35	15	10	17	23	1.74
25. Cast wax pattern	14	33	10	8	1.18	16	14	15	20	1.60
26. Clean and polish wax pattern	13	30	12	10	1.29	16	12	15	22	1.66
27. Construct an acrylic temporary crown	10	24	12	18	1.57	12	7	15	31	2.00
Pharmocology										
1. Maintain a prescription record of drugs on patient chart	5	10	9	41	2.32	6	2	8	49	2.54
2. Dispensing of drugs to patient	10	26	13	16	1.54	13	7	11	34	2.02
3. Complete an inventory and store drugs	9	16	14	26	1.88	12	5	13	35	2.09
4. Write a prescription	12	28	9	15	1.40	14	11	8	31	1.89

TASK INVENTORY DENTAL ASSISTANT	Frequency of Performance Never	Seldom	Occass.	Freq.	Average	Importance of Performance None	Slight	Mod.	Great	Average
Pharmocology										
5. Keep legal records of narcotics	5	18	7	27	1.98	4	6	6	44	2.50
Office Management										
1. Fill out a get acquainted card and health history record	3	4	1	52	2.70	3	1	2	56	2.79
2. Fill out a service rendered card	2	8	4	44	2.55	2	4	6	49	2.67
3. Fill out an estimate card	2	15	13	28	2.16	1	8	8	39	2.52
4. Fill out a contract card	3	17	8	30	2.12	3	7	8	43	2.90
5. Make out statements	2	6	6	47	2.61	1	3	2	55	2.82
6. Fill out daily ledger	2	6	3	47	2.64	1	1	1	56	2.90
7. Fill out monthly summary	2	8	5	39	2.50	1	4	5	46	2.71
8. Fill out yearly summary	2	14	8	37	2.6[illegible]	1	5	6	42	2.65
9. Fill out a monthly disbursement sheet	3	15	9	30	2.16	2	5	8	40	2.56
10. Fill out a yearly disbursement sheet	4	14	10	28	2.11	3	7	8	39	2.46
11. Fill out a petty cash record book	4	14	9	31	2.16	3	7	9	38	2.44
12. Write out a check	2	13	4	36	2.35	1	4	4	46	2.73
13. Make out a deposit slip and endorse checks	3	6	5	43	2.49	2	2	5	51	2.73
14. Balance a check book	2	11	6	38	2.40	1	4	7	45	3.00
15. Return a bad check to a patient	3	26	12	15	1.70	2	8	11	33	2.39
16. Fill out an application for social security	3	28	9	14	1.63	2	11	11	31	2.29
17. Fill out a personal tax exemption card	3	26	9	15	1.68	2	11	9	33	2.33
18. Make out a personal tax return	5	21	11	18	1.76	4	8	11	32	2.29
19. Schedule dental appointments										
20. Use the teletrainer	9	26	7	10	1.35	8	10	11	22	1.92

TASK INVENTORY DENTAL ASSISTANT	Frequency of Performance					Importance of Performance				
	Never	Seldom	Occass.	Freq.	Average	None	Slight	Mod.	Great	Average
Office Management										
21. Set up a recall file system	3	5	14	42	2.48	5	1	9	48	2.59
22. Make out an age analysis sheet	16	31	11	7	1.15	19	18	9	17	2.86
23. Call a delinquent patient	7	6	25	26	2.09	10	4	14	34	2.16
24. Write a letter to a delinquent patient	5	12	23	22	2.00	10	6	15	31	2.08
25. Turn an account over for collection	7	11	28	17	1.87	8	5	18	31	2.16
26. Call supply house and place order	3	5	16	39	2.44	5	1	10	46	2.56
27. Receive and store supplies	2	0	10	51	2.75	5	1	10	46	2.56
28. Type a block style letter	10	9	14	30	2.02	11	7	10	34	2.08
29. Type a modified block style letter	9	13	18	23	1.87	11	7	15	30	2.01
30. Compose, type letter of request	7	10	16	30	2.10	10	5	13	35	2.16
31. Compose, type letter of appreciation	9	12	18	24	1.85	13	5	12	33	2.03
32. Compose, type letter of credit reference	8	19	16	20	1.85	12	8	12	29	1.95
33. Compose, type letter of ordering	10	12	19	22	1.84	13	7	13	30	1.95
34. Compose, type letter of recall	8	13	14	28	1.98	10	6	13	24	1.96
35. Type addresses on envelopes	6	11	11	35	2.19	9	7	7	40	2.24
36. Care and maintenance of typewriter	3	15	23	22	1.98	7	7	18	32	2.21
37. Change ribbon and paper of adding machines	6	13	22	22	1.92	9	5	18	32	2.14
38. Operate an adding machine	4	6	17	36	2.35	6	4	14	39	2.37
39. File patient records	1	1	9	52	2.78	3	2	8	50	2.67
40. File financial records	7	4	8	44	2.41	8	4	6	36	2.30
41. File patient X-rays	0	2	5	56	2.86	2	1	4	56	2.81
42. File study models	2	10	15	36	2.35	4	6	13	40	2.41

APPENDIX A

SURVEY MATERIALS

IML INSTRUCTIONAL MATERIALS LABORATORY
TRADE AND INDUSTRIAL EDUCATION
THE OHIO STATE UNIVERSITY, 1885 NEIL AVENUE, COLUMBUS, OHIO 43210 | TELEPHONE 614 · 422-5001

MEMORANDUM

TO: Ohio Dental Assistants

FROM: William L. Ashley, Research Associate, The Instructional Materials Laboratory

RE: Dental Assisting Occupational Analysis

DATE: October 12, 1973

The Vocational Instructional Materials Laboratory at the Ohio State University is presently involved in a project to develop new instructional materials and an occupational analysis in your field.

We are attempting at this time to develop and validate an accurate task inventory of the Dental Assisting occupation.

You have been identified as one of a select group who compose a source of valid occupational information concerning the task demands in the field of dental health. We therefore are soliciting your assistance in developing the task inventory so necessary for the design of sound vocational materials.

Your participation is vitally essential in this project and your generous assistance will be greatly appreciated. Please give us about fifteen minutes of your time to assist in this effort to improve and update instructional materials in your vocation.

Please use the self-addressed, stamped envelope enclosed to return the completed questionnaire within one week. Your prompt response will ensure the inclusion of your opinions in our study.

Thank you for your professional attitude and assistance.

/j

Instructions for Completing the Task Inventory

1. Read each of the task statements carefully.

2. Under the "Frequency of Performance" heading please check one of the three subcolumns which expresses your judgement of how often the task is performed compared to all other tasks.

3. Under the "Importance of Performance" heading please check one of the three subcolumns which expresses your judgment of how important the correct performance of the task is for job success compared to all other tasks.

4. At the bottom of any of the pages, write in and rate any tasks you perform which are not listed.

TASK INVENTORY

DENTAL ASSISTANT

TASK STATEMENT	Frequency of Performance			Importance of Performance		
	Seldom	Occasionally	Frequently	Slight	Moderate	Great
Chairside Assisting						
1. Open dental office						
2. Preparation of operatories						
3. Operate chair						
4. Operate dental unit						
5. Greet patient						
6. Seat patient						
7. Set up and assist for an examination						
8. Chart using the universal method						
9. Chart using Bosworth method						
10. Chart using Palmer's method						
11. Set up and assist with Flouride treatment						
12. Set up and assist with prophylaxis						
13. Use dental floss						
14. Demonstrate toothbrushing						
15. Set up and assist with local anesthetic						
16. Retract tongue and cheeks						
17. Use and clean the oral evacuator						
18. Pass and receive instruments with one hand and with two hands						
19. Set up and assist with an amalgam procedure						
20. Set up and assist with the placement and removal of rubber dam						
21. Set up and assist with amalgam polish						
22. Set up and assist for a porcelain procedure						
23. Set up and assist with a porcelain polish						
24. Set up and assist with a gold foil procedure						
25. Set up and assist for an indirect gold inlay pup						
26. Set up and assist with cementing a gold inlay						
27. Clean operatory after a procedure						
28. Drain and lubricate the air compressor						
29. Take apart, clean and lubricate a conventional right angle handpiece						
30. Take apart, clean and lubricate a prophy angle						
31. Take apart, clean and lubricate a conventional straight handpiece						
32. Change the chuck in a high speed handpiece						
33. Clean and wax the dental unit						
34. Oil the dental engine						
35. Clean and oil the pullies on the engine arm						

TASK INVENTORY DENTAL ASSISTANT	Frequency of Performance			Importance of Performance		
TASK STATEMENT	Seldom	Occasionally	Frequently	Slight	Moderate	Great
36. Change the engine belt						
37. Arrange instruments in the operatory cabinets						
38. Color code instruments						
39. Change the bulb in the unit lamp						
40. Close the office						
Chairside Assisting, Specialties						
1. Set up for crown and bridge preparation						
2. Assist with a crown and bridge preparation						
3. Set up and assist with a bridge tryin						
4. Set up and assist for seating a bridge						
5. Set up and assist for the first denture procedure						
6. Set up and assist for the second denture procedure						
7. Set and assist for the third denture appointment						
8. Set up and assist for the fourth denture appointment						
9. Set up and assist for the fifth denture appointment						
10. Set up and assist for the first partial denture appointment						
11. Set up and assist for the second partial denture appointment						
12. Set up and assist for the third partial denture appointment						
13. Set up and assist for a periodontal scaling and subgingival currettage						
14. Set up for a gingivectomy						
15. Mix periodontal pack						
16. Prepare patient for surgery						
17. Prepare self for surgery						
18. Use surgical aspirator						
19. Assist with a gingivectomy						
20. Clean surgical aspirator						
21. Consult patient about proper diet						
22. Sharpen periodontal instruments						
23. Set up and assist with pack removal						
24. Set up for the removal of maxillary teeth						
25. Assist with the removal of the maxillary teeth						
26. Set up and assist with removal of mandibular teeth						
27. Prepare sutures						
28. Set up and assist with suture removal						
29. Set up and assist with treatment for dry socket						
30. Set up and assist with the removal of impacted teeth						
31. Set up and assist with an alveolectomy						

TASK INVENTORY DENTAL ASSISTANT	Frequency of Performance			Importance of Performance		
TASK STATEMENT	Seldom	Occasionally	Frequently	Slight	Moderate	Great
32. Set up and assist with tori removal						
33. Set up and assist with a biopsy						
34. Take a blood pressure						
35. Take an oral temperature						
36. Set up and assist with the diagnosis of an endodonticPatient						
37. Set up and assist with cavity preparation and reaming a root canal						
38. Set up and assist with irrigating cultures and disenfecting a root canal						
39. Set up and assist with canal abturation						
40. Set up and assist with a pulpotomy						
41. Set up and assist with an apicoectomy						
42. Set up and assist with a chrome crown procedure						
43. Set up for the fabrication of a space maintainer						
44. Assist with the fabrication of a space maintainer						
45. Set up and assist with the diagnosis of an orthodontic patient						
46. Prepare and trim orthodontic models						
47. Set up for the banding appointment						
48. Size orthodontic bands						
49. Weld or solder brackets to orthodontic bands						
50. Set up and assist with the removal of orthodontic bands						
51. Process an acrylic retainer						
52. Consult patient on do's and don't's while wearing orthodontic appliances						
Radiology						
1. Demonstrate how the component parts of an X-ray unit work						
2. Seat the patient						
3. Consult with patient on the importance of X-rays						
4. Place X-rays for short cone technique						
5. Place cone tip for the short cone technique						
6. Place X-ray for the long cone technique						
7. Place cone tip for long cone technique						
8. Expose film						
9. Process film						
10. Mount films						
11. Clean and prepare the developing tank						
First Aid						
1. Treat patient for shock						
2. Treat patient for hemorrage						
3. Treat patient for respiratory failure						

TASK INVENTORY DENTAL ASSISTANT	Frequency of Performance			Importance of Performance		
TASK STATEMENT	Seldom	Occasionally	Frequently	Slight	Moderate	Great
4. Treat patient for foreign body in eye and throat						
5. Treat patient for minor burns						
6. Treat patient for minor wounds						
7. Treat patient for convulsions						
8. Treat patient for cardiac arrest						
9. Treat patient for various injuries						
10. Treat a patient for poison						
Microbiology and Sterilization						
1. Use a microscope						
2. Make a culture media						
3. Take culture						
4. Clean and prepare the autoclave						
5. Scrub and sterilize instruments for autoclave						
6. Wrap and pack instruments for autoclave						
7. Clean container, prepare chemicals for sterilization						
8. Prepare, sterilize instruments for chemical sterilization						
9. Prepare, sterilize instruments in hot oil						
10. Prepare,sterilize instruments in boiling water						
11. Prepare, sterilize instruments in dry heat and alcohol						
12. Prepare, sterilize instruments using ultrasonic						
13. Store surgery instruments						
14. Store operative instruments						
Dental and Lab Materials						
1. Mix zinc oxide-eugenol for base and temporary						
2. Mix zinc phosphate for temporary; cementation; base fillings						
3. Mix amalgam for restorative purposes						
4. Mix silicate for restorative purposes						
5. Mix resin for restorative purposes						
6. Mix acrylic for restorative purposes						
7. Prepare gutta percha for temporary fillings						
8. Select and bead trays						
9. Mix alginate to take an impression						
10. Boxing an impression						
11. Pour a plaster mold						
12. Pour a stone model						
13. Trim a stone and plaster model						
14. Make a partial and complete impression tray (custom)						
15. Mix metallic zinc oxide base for an impression						
16. Mix rubber base and load syringe for impression						

TASK INVENTORY

DENTAL ASSISTANT

TASK STATEMENT	Frequency of Performance			Importance of Performance		
	Seldom	Occasionally	Frequently	Slight	Moderate	Great
17. Mix silicones for impression						
18. Prepare hydrocolloid for an impression						
19. Prepare compounds for impressions						
20. Construct a base plate						
21. Construct wax rims						
22. Articulate models						
23. Carve wax pattern						
24. Sprue and invest wax patterns						
25. Cast wax pattern						
26. Clean and polish wax pattern						
27. Construct an acrylic temporary crown						
Pharmocology						
1. Maintain a prescription record of drugs on patient chart						
2. Dispensing of drugs to patient						
3. Complete an inventory and store drugs						
4. Write a prescription						
5. Keep legal records of narcotics						
Office Management						
1. Fill out a get acquainted card and a health history record						
2. Fill out a service rendered card						
3. Fill out an estimate card						
4. Fill out a contract card						
5. Make out statements						
6. Fill out daily ledger						
7. Fill out monthly summary						
8. Fill out yearly summary						
9. Fill out a monthly disbursement sheet						
10. Fill out a yearly disbursement sheet						
11. Fill out a petty cash record book						
12. Write out a check						
13. Make out a deposit slip and endorse checks						
14. Balance a check book						
15. Return a bad check to a patient						
16. Fill out an application for social security						
17. Fill out a personal tax exemption card						
18. Make out a personal tax return						
19. Schedule dental appointments						
20. Use the teletrainer						

TASK INVENTORY DENTAL ASSISTANT	Frequency of Performance			Importance of Performance		
TASK STATEMENT	Seldom	Occasionally	Frequently	Slight	Moderate	Great
21. Set up a recall file system						
22. Make out an age analysis sheet						
23. Call a delinquent patient						
24. Write a letter to a delinquent patient						
25. Turn an account over for collection						
26. Call supply house and place order						
27. Receive and store supplies						
28. Type a block style letter						
29. Type a modified block style letter						
30. Compose, type letter of request						
31. Compose, type letter of appreciation						
32. Compose, type letter of credit reference						
33. Compose, type letter of ordering						
34. Compose, type letter of recall						
35. Type addresses on envelopes						
36. Care and maintenance of typewriter						
37. Change ribbon and paper of adding machines						
38. Operate an adding machine						
39. File patient records						
40. File financial records						
41. File patient X-rays						
42. File study models						

I.S.D. WORKSHOP EVALUATION SCALE

Please circle the number indicating your present position.

1. Local Vocational Director
2. Local Vocation Supervisor
3. Vocational Instructor
4. Teacher Educator
5. Other ______________________________
(Specify)

Part I - Directions:

Read each statement carefully and decide how you feel about it. You will agree with some statements and disagree with others. You are offered five possible answers to each statement. The "undecided" answer should be circled only when you have no opinion. Circle one number following each statement. Please answer all statements.

Example:	Strongly Agree	Agree	Un-decided	Dis-agree	Strongly Disagree
The city needs to improve garbage collection schedules	5	4	3	2	1

This person feels in no uncertain terms that garbage collection schedules are inadequate.

Statements	Strongly Agree	Agree	Un-decided	Dis-agree	Strongly Disagree
1. The goals of this workshop were clear to me	5	4	3	2	1
2. The objectives of this workshop were not realistic	5	4	3	2	1
3. Specific goals made it easy to work efficiently	5	4	3	2	1
4. The participants accepted the purposes of this workshop . .	5	4	3	2	1
5. The objectives of this workshop were not the same as my objectives	5	4	3	2	1

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
6. I didn't learn anything new	5	4	3	2	1
7. The material presented was valuable to me	5	4	3	2	1
8. I could have learned as much by reading a book	5	4	3	2	1
9. Possible solutions to my problems were considered	5	4	3	2	1
10. The information presented was too elementary	5	4	3	2	1
11. The consultants really knew their subjects	5	4	3	2	1
12. The group leaders were well prepared	5	4	3	2	1
13. I was stimulated to think objectively about the topics presented	5	4	3	2	1
14. New acquaintances were made which will help in my future work	5	4	3	2	1
15. We worked together as a group	5	4	3	2	1
16. We did not relate theory to practice	5	4	3	2	1
17. The sessions followed a logical pattern	5	4	3	2	1
18. The schedule was too fixed	5	4	3	2	1
19. The group discussions were were excellent	5	4	3	2	1
20. There was very little time for informal conversation	5	4	3	2	1
21. I did not have an opportunity to express my ideas	5	4	3	2	1
22. I really felt a part of this group	5	4	3	2	1
23. My time was spent well	5	4	3	2	1

Statements	Strongly Agree	Agree	Un-decided	Dis-agree	Strongly Disagree
24. The program met my expectations	5	4	3	2	1
25. I have no guide for future action	5	4	3	2	1
26. Too much time was devoted to trivial matters	5	4	3	2	1
27. The information presented was too advanced	5	4	3	2	1
28. The content presented was not applicable to occupational programs	5	4	3	2	1
29. Workshops of this nature should be offered again in future years	5	4	3	2	1
30. Workshops such as this will contribute little to my job .	5	4	3	2	1
31. The strategies presented were useful to me in my job . . .	5	4	3	2	1
32. The reference available to participants were not appropriate	5	4	3	2	1
33. The administrators in my school encourage innovations in classroom teaching methods . . .	5	4	3	2	1
34. I believe attempts should be made to base instruction on performance objectives . . .	5	4	3	2	1
35. I find that instruction using performance objectives is valuable in helping the student succeed	5	4	3	2	1
36. An instructional system that encourages the student to assume greater responsibility for his/her learning is desirable for Vocational Education	5	4	3	2	1
37. I advocate that individual student needs are not the basis of good vocational instruction	5	4	3	2	1

Statements	Strongly Agree	Agree	Un-decided	Dis-agree	Strongly Disagree
38. The implementation performance objectives in the classroom is so time-consuming that their use is not feasible	5	4	3	2	1
39. I will have problems convincing the administrator in my school of the worth of the I.S.D. approach	5	4	3	2	1
40. I feel that I have access to sufficient outside assistance and advice to implement the I.S.D. approach in my school . . .	5	4	3	2	1
41. I think that instruction using performance objectives is valuable in helping the student succeed on the job	5	4	3	2	1
42. I teach every student the same way because it has worked well for years	5	4	3	2	1
43. I believe it is more important to work with the entire class than to spend a lot of time with individuals	5	4	3	2	1
44. I feel that instruction using performance objectives is asking too much of the instructors .	5	4	3	2	1
45. The pre-test/post-test format of the I.S.D. approach is not adequate for evaluation of student' learning	5	4	3	2	1
46. I feel that criterion referenced testing (testing against an objective) is more fair to students than norm referenced testing (testing against a class average)	5	4	3	2	1
47. I agree that all students don't learn at the same rate and should be taught accordingly	5	4	3	2	1

Project Results

After the presentation of the various concepts concerning the systems approach and the process of instructional systems design the participants where asked to design sample materials. Specifically, each of the service areas were asked to develop a course outline based upon the occupational analysis representing their service area. Once the course outlines had been developed the participants were asked to work out a format for courses of study. Each vocational service was given directions as to what must be in a course of study, and were shown how to incorporate the various systems concepts. THe participants were basically told the course of study had to show what was to be learned, when it was to be taught, how it was to be taught, and how would one know when it was learned.

The following are samples that the institute/workshop participants developed.

I. Agriculture – Horticulture
II. Business and Office Education – Data Accounting
III. Distributive Education – Auto Sales
IV. Health – Medical Assisting
V. Home Economics – Baking
VI. Trade and Industrial – Auto Mechanic

I - Agriculture – Horticulture

Retail Floriculture Course of Study

I. Overall Instructional Strategy

A. The "Retail Florist" program at the ________________________ Vocational School is one of two parts of the 12th grade Horticulture program. The other part is "Greenhouse Management" which is taught concurrently with the Retail Florist program. The total course is 36 weeks of instruction at 180 days. The course meets for 4 1/2 hours per day with 3 hours laboratory and 1 1/2 hours in the related classrooms. This gives a total of 540 hours of lab experience and 270 hours of related classroom experience, or a grand total of 810 hours of instruction. The program should maintain a minimum of 15 students and a maximum of 25 students/class. Since the "Retail Florist" is a year round industry, the course of study will be integrated throughout the year with the other job. 270 hours per student in the 4 lab stations are planned by this course of study in the Retail Florist field plus 135 hours of related instruction.

B. Prior to enrollment in the senior program, students are required to participate in the junior horticulture class, where they would understand the basic concepts of plants and their care. Also the student would have had an opportunity to learn about and apply leadership skills and develop desirable personnel traits through participation in the F.F.A.

Facilities and equipment available for instruction are defined in two main areas: Community resources and school resources.

1. The most important community resources is an advisory committee consisting of greenhouse operators, florists, a parent, student, and graduates. The florists and greenhouse businesses are available for field trips, and the owners and operators are available as resource individuals.
2. School Resources
    a. Equipment and facilities include an appropriate sales and display area, which has a display and storage cooler, cash register, phone and miscellaneous equipment incidental to the business.
    b. Facilities include 720 sq. ft. classroom area, 200 sq. ft. of office and conference area, greenhouse, and a headhouse for laboratory facilities.
    c. Instructional Materials

    Adequate instructional materials must be provided. A minimum of $1800 must be provided to develop an initial instructional materials library. A total of $300 per year should be budgeted to maintain the instructional materials library.

C. Program objectives relative to school and community needs.
   1. The "Retail Florist" program to develop trained employees for entry level employment in the industry.
   2. To develop an overall attitude and appreciation for the floriculture industry.
   3. To involve students in contests and displays sponsored by community related organizations.
   4. To provide adult programs for interested individuals in the district.

D. In developing a course of studies, several resources will be utilized:
   1. State task analysis
   2. Curriculum guides
   3. Man power needs
   4. Interest and needs of the student
   5. Facilities and equipment available

E. To determine the amount of time spent on each duty area, a list of duty areas in teaching order should be reviewed by the instructor and advisory committee. A percent of the total allotted for the course should be designated for each duty area. The percentage of time assigned to each duty area can then be broken down into the number of total hours spent in related and laboratory for each duty area. When the total amount of time has been allotted for each duty area, a similar method can be used to determine the amount of time spent on each task within a given duty area. The total list of tasks and hours will then be distributed among junior and senior class.

F. Instruction will be based on performance objectives which relate to specific tasks. Each performance objective will contain three criteria:
   1. What is to be measured
   2. Conditions under which the performance is measured and
   3. Level of performance expected

G. Instruction will be based on real problems which students experience. This will be accomplished by establishing a list of guidelines to incorporate into the program. The guidelines include:

1. A procedure whereby a supply of flowers is available with the funeral directors to supply the school with instructional purposes.
2. A procedure that will acquaint the community with the services available by Retail Florist program.
3. A procedure where Florists may provide resources.
4. A procedure to establish a customer service program acceptable to local industry.

H. Instruction will provide for student mastery of essential knowledge, skills and attitudes by various performance tests. Multiple-choice paper and pencil tests will be the major source of testing in related class. Laboratory tests performing specific skills will also be utilized. The instructor will maintain a skills chart on skills that his or her students are competent in performing.

Duty Area A. Designing

Tasks

1. Arrange a funeral basket
2. Arrange a hospital vase
3. Arrange a center piece
4. Make a casket spray
5. Make up a bud vase
6. Construct a set piece (emblem)
7. Make a boutonniere
8. Make a corsage
9. Make a wedding bouquet
10. Decorate scene of wedding
11. Dress a blooming plant
12. Arrange a fruit basket
13. Plant a dish garden (terrarium)

Duty Area B. Selling and Servicing

Tasks

1. Sell a floral product (floor)
2. Establish and maintain display area
3. Wrap a floral product
4. Sell a floral product - (phone)
5. Maintain files and records

Duty Area C. Delivering and Servicing

Tasks

1. Maintain delivery area
2. Maintain delivery vehicle
3. Make deliveries
4. Maintain sales records and receipts

Agricultural Education

Taxonomy ________________

Job Retail Florist

Duty Area Designing

School ________________

____
Instructor

____
Date

Duty Area

Time Sequence

Date 1
From

To

Hours of Instruction

Related

15
Laboratory

Performance Objectives

1. The student will choose the flower and foliage to properly design the corsage according to specifications.
2. The student will properly wire and tape a corsage.
3. The student will be able to make a bow that fits in with the design of the corsage.
4. The student will be able to assemble the corsage according to specifications.

Course outline tasks

Make a corsage
Skills
1. Select the flowers and foliage.
2. Wire flowers and foliage.
3. Tape the flowers.
4. Make a bow.
5. Assemble the corsage.

Related Instruction

Lecture on occasion and how to wear a corsage
Slides and tapes on types of corsages
Lecture and discussion
Principles of corsage making
Elements of corsage making
Demonstration on how to assemble
Field trip type show
Resource people

Reference and Visuals

Retail Flower Shop Operation and Management, A Teacher's Guide to Flower Arrangement, Agricultural Education Department, Pennsylvania State University
Beginning Techniques in Flower Arranging, Vocational Education Productions, California Polytechnic State University
Designing with Flowers and Decorating Materials, Agriculture Education Department, Pennsylvania State University
Floral Design Pointers, American Can Company

Related Discipline	Facilities and Equipment	Student Evaluation
Communications Reading and interpreting orders	Area head house, knives, wire, shears, tape, bows and ribbons, staples, parofilm, decorative novelties and materials, moss, foam, filter	(1.) Maintain skill chart on on performance ability
Mathematics 1. Basic arithematic skills to arrive at price 2. Ratio and proportions 3. Measure and weight 4. Time and speed		(2.) Related Instruction
Science Psychological and physical factors Principles of design Elements of design		(3.) Laboratory Experiences
Safety Proper use of tools and equipment		

MAKING A CORSAGE

Learning Station 1 Office and Sales Area	Learning Station 2 Corsage and Wedding Bench	Learning Station 3 Arrange Centerpiece	Learning Station 4 Plant a Dish Garden
A. Number of students – 2-4 B. Fifteen hours C. Task – Perform customer service D. Skills developed 1. Take order floor or phone 2. Maintain selling area 3. Wrap floral products 4. Maintain files and records E. Activity – Perform administrative housekeeping and customer service duties as required by industry	A. Number of students – 2-4 B. Hours – 15 C. Task – Making a corsage D. Skills 1. Selecting flowers and foliage for the occasion 2. Wiring flowers and foliage 3. Taping flowers 4. Making a bow 5. Assembling a bow E. Activity – Perform steps to make a corsage that is acceptable to the profession.	A. Number of students – 2-4 B. Hours – 15 C. Task – Arrange centerpiece D. Skills 1. Select a container and design 2. Select foliage, flowers, and accessories 3. Prepare container 4. Wire flowers and foliage 5. Assemble arrangement E. Activity – Design a centerpiece as specified	A. Number of students – 2-4 B. Hours – 15 C. Task D. Skills 1. Select the container 2. Prepare median 3. Select plants 4. Insert plants 5. Water plants 6. Clean foliage 7. Clean container 8. Maintain area E. Activity – Plant a dish garden or terrarium to specification
Learning Station 5	Learning Station 6	Learning Station 7	Learning Station 8

DUTY: Designing

TASK: Make a corsage (Carnation Triangular)

October 27 to 31

RELATED:

Behavioral Objective: Students will list and explain the steps in designing and preparing a given corsage.

Related Topics:

A. Importance of knowing the occasion

B. 1. Methods of wiring

- a. Clutch
- b. Piercing
- c. Hook
- d. Hairpin

2. Size and use of wire

C. 1. Choice of size and color of tape

2. Procedure in making a bow

D. 1. Bow color, size, and material

2. Procedure in making a bow

E. 1. Principles of floral arrangement

- a. Design
  - 1. Crescent
  - 2. Triangular
  - 3. Oval
  - 4. Solitary flowers (wrist, shoulder, waist, hair, etc.)
- b. Line
  - 1. Form
  - 2. Pattern
  - 3. Texture
  - 4. Color

LABORATORY:

Behavioral Objective: The student will make a corsage using the flowers and materials provided by the instructor of an acceptable quality at a reasonable rate of speed, prescribed by the instructor.

Tasks:

A. Selecting the flowers and foliage
- 1. Carnation
- 2. Rose
- 3. Orchid
- 4. Leatherleaf
- 5. Camelia (artificial and/or real materials)

B. Wiring of flower and foliage

C. Taping a flower

D. Making a bow

E. Assembling of the corsage

c. Balance

d. Scale

e. Harmony

f. Focal point

g. Accent

h. Rhythm

i. Repetition

j. Unity

2. Linting, waxing, preserving of fresh flowers and foliage

F. Identification

G. Safety

F. Identification

G. Safety

STUDENT EVALUATION:

1. Students will take an order for a given corsage, select appropriate materials and construct a corsage which will meet the requirements of the order and be satisfactory to the floral industry.

2. Each student will list and explain the basic principles of corsage design.

ADDITIONAL ACTIVITIES AND MOTIVATION ACTIVITIES:

Outside resource people - florists
Field trip to flower shop
Slides - how to make a corsage
Style show

Equipment, materials, and teaching aids:

1. Wire
2. Ribbon
3. Greens
4. Flowers
5. Tape
6. Cotton
7. Netting (tufts)
8. Pins
9. Tubes
10. Scissors
11. Knife
12. Shears
13. Water
14. Accessories
15. Chen ille
16. Cellophane bag
17. Wrist band
18. Basket

REFERENCES:

Retail Flower Shop Operation and Management, A Teacher Guide to Flower Arrangement, Agricultural Education Department, Pennsylvania State University.

Beginning Techniques in Flower Arranging, Vocational Education Productions, California Polytechnic State University.

Designing with Flowers and Decorating Materials, Agricultural Education Department, Pennsylvania State University.

Floral Design Pointers, American Can Company

Cements, Julia, *Fun Without Flowers*, Van Nostrand Schmidt.

Mimi, Hearthside; *The Complete Book of Artificial Flowers, Fruits and Foliage*.

Date____________________

DUTY: Designing
TASK: Make a Corsage

RELATED INSTRUCTION EVALUATION:

List the four basic designs of corsages:

1.

2.

3.

4.

What equipment and tools are necessary to construct the corsage:

5.

6.

7.

8.

Given a situation of making a corsage of three red carnations, complete the following information:

9. Size of ribbon? ____________________

10. Color of ribbon? ____________________

11. Size of wire? ____________________

12. Method of wiring?____________________

13. Color of floral tape? ____________________

14. Size of floral tape? ____________________

15. Type of background foliage? ______________________________

16. Size of corsage bag? ______________________________

17. Size of corsage pin? ______________________________

What is the basic type of background foliage that is utilized in corsages?

18. ______________________________

List three common corsage flowers:

19.

20.

21.

Matching — Place letter by correct number.

______ 22. Clutch

______ 23. Number 24

______ 24. Number 3

______ 25. Leather leaf

______ 26. Crescent

______ 27. Knife

______ 28. Color

______ 29. Boutonniere

______ 30. Orchid

______ 31. Taping

A Basic design

B Width of ribbon

C Element of design

D Cattelya

E Size of wire

F Twist and pull

G Method of wiring

H Worn by men on his lapel

I Designers 11th finger

J Type of foliage

True False - T or F

______ 32 Always use Baker Fern Foliage in making a corsage

______ 33 Carnations are usually the flower to use for a boutonniere

______ 34 The focal point is important in corsage making

______ 35 The ribbon of a corsage should blend with the flowers

______ 36 Carnations are a popular corsage flower

______ 37 One should know the occassion, size and age of person before constructing corsage

______ 38 Piercing is a method of taping flowers

______ 39 The size of wire used in corsage making is important

______ 40 Corsage pins come in different sizes

______ 41 Time taken to make a corsage is not important

Laboratory Evaluation:

You are to construct a red carnation corsage of three flowers for a price of $________________________.

II - Business and Office Education – Data Accounting

COURSE OUTLINE
(Two Year Program)

DATA ACCOUNTING
JUNIOR YEAR

I. PREPARE FOR MACHINE OPERATION

A. Prepare the Machine Area for Operation

1. Read section(s) of machine's manual related to preparing the machine area

2. Level the machine before starting it

3. Bring files of records to the area

4. Bring source documents to the area for use in posting, journalizing, and/or other processing

B. Prepare the Machine for Operation

1. Read section(s) of machine's manual related to preparing the the machine for operation

2. Clear any figures in item/posting counter, if needed

3. Load the machine with proper form(s)

4. Clear the machine of any totals, or other information not needed on the current operations

5. Place proper date in the machine

6. Verify and insure that the operational mode of the machine is consistent with current

II. OPERATE RELATED OFFICE MACHINES

A. Operate a ''Ten Key'' Adding-Listing Machine and/or Calculator

B. Operate a ''Full Key'' Adding-Listing Machine

C. Operate an Alphabetical and/or Numerical Sorter

D. Operate a Telephone

E. Operate a Typewriter

III. MAINTAIN MACHINES IN PROPER WORKING ORDER

A. Read Section(s) of Machine's Manual Related to Maintaining the Machine

B. Maintain Proper Machine Environment (Humidity, Temperature, Power Source)

C. Perform Preventive Maintenance

IV. PREPARE FINANCIAL STATEMENTS

A. Prepare Source Documents

B. Post all Journal Entries to General Ledger

C. Assist in Preparing Financial Statements and Government Reports

V. HANDLE BANKING DUTIES

A. Prepare Source Document for Processing

B. Maintain Cash Control

C. Prepare Bank Reconciliation

D. Maintain Checking Account

E. Deposit Cash, Checks, Money Orders

F. Maintain Petty Cash Fund

VI. RECORD CASH RECEIPTS

A. Inspect Checks and Money Orders

B. Prepare Deposit Slips

C. Process Cash and Trade Discounts

D. Summarize Daily Cash Recepts

E. Post Subsidiary Receivable Ledger

F. Prepare Source Documents

G. Operate Data Entry Equipment

1. Keypunch

2. Verifier

3. Sorter

VII. MAINTAIN ACCOUNTS PAYABLE RECORDS

   A. Prepare Source Documents

   B. Operate Data Entry Equipment

   C. Determine Propriety of Invoice

   D. Prepare Voucher

   E. Issue Debit Memorandums

VIII. HANDLE CASH DISBURSEMENTS

   A. Prepare Work Source Document

   B. Operate Data Entry Equipment

   C. Verify Approved Checks

   D. Prepare Checks

IX. MAINTAIN ACCOUNTS RECEIVABLE RECORDS

   A. Prepare Source Document

   B. Operate Data Entry Equipment

   C. Verify Source Documents

   D. Check Invoices for Customer Credit

   E. Prepare Customer Invoices

   F. Summarize Daily Sales

   G. Post Accounts Receivable Subsidiary Ledger

   H. Research Customer Complaints

   I. Credit Accounts for Returns and Allowances

   J. Age Accounts - Record Bad Debts

   K. Prepare Statements of Customer Accounts

X. PREPARE PAYROLL

   A. Prepare Source Document

   B. Operate Data Entry Equipment

   C. Prepare Payroll Register

D. Prepare Payroll Checks

E. Summarize Payroll Register

XI. PREPARE EMPLOYEE RECORDS

A. Prepare Source Document for Processing

B. Operate Data Entry Equipment

C. Process Employee Application

D. Process Employee Withholding and Other Deduction Authorizations

E. Update Employee Records

XII. PREPARE TAX REPORTS - PAYROLL

A. Prepare Source Documents

B. Prepare Form W-2

C. Prepare Employer FICA and Income Tax Forms

D. Prepare City and State Income Tax Forms

E. Prepare Federal and State Unemployment Forms

XIII. MAINTAIN FILES

A. Set up Filing System

B. Prepare Materials for the Files

C. Sort the Materials

D. Cross Reference Material

E. Arrange and Place Material

F. Care for the Records

XIV. MAINTAIN INVENTORY CONTROL RECORDS

A. Record Depreciation Where Applicable

B. Prepare Source Document

C. Log all Purchase Orders

D. Maintain Raw Materials Inventory Records

E. Update Inventory Records

XV. SUPERVISE PROGRAMMING

A. Analyze the Problem

B. Program Flow Charts

C. Develop Programs

D. Assemble or Compile the Object Program

E. Test and Correct the Program

F. Prepare the Program for Production

XVI. OPERATE THE BOOKKEEPING MACHINE

A. Read the Section(s) of the Machine's Manual Related to Operating the Machine

B. Select the Proper Record from the Files

C. Place the Machine into Proper Alignment(s)/Sub-mode(s) to Receive the Ledger on Other Items

D. Insert the Appropriate Ledger (or Other Items) into the Machine, Annually In-put Data from the Ledger (or Other Items) by Using the Machine(s) Keyboard

E. Select the Proper Source Document Necessary for a Given Operation

F. Depress Proper Keys on the Machine's Keyboard According to the Figures Shown on the Source Document(s) and the Operation to be Performed

G. Activate the Machine to Function According to its Mode(s) and/or Sub-mode(s); or, Allow the Machine to Function, Processing the Input Data

H. Remove the Processed Ledger (or Other Item) from the Machine

I. Return the Processed Ledger (or Other Item) to its Proper Place in the File

J. Place the Source Document Aside in an Appropriate Place

K. Monitor all Procedures and Documents for Errors; and, Correct Correct Errors According to Established Procedures and Policies

L. Correctly Suspend Operation of the Machine when Temporarily Necessary

M. Total, or ''Clear,'' the Machine when Last Posting, Journalizing and/or Other Operation is Completed

N. Verify Total(s) - Resulting from ''Clearing'' the Machine - With Total(s) or the Type of Source Document. Verify Accuracy of Posting, Journalizing and/or Other Completed Operations

O. Record all Figures and Totals Necessary, as Directed

P. Use, Appropriately, the Count Made by the Counter of Items/Postings

Q. Bundle Source Documents by Type

R. React to Safety Emergencies According to Established Procedures

XVII. OPERATE PROGRAMMABLE ACCOUNT MACHINE

A. Operate Console

B. Load programs and Data Cards

C. Maintain Equipment

D. Prepare Back up Data for Storage

E. Supervise Storage of Back up Data

F. Operate Magnetic Tape Units

G. Maintain Card Files

H. Initiate Emergency Test Procedure

I. Operate Card Reader

J. Operate Card Punch

K. Operate Line Printer

L. Operate Optical I/O Devices

M. Load and Operate Disk Drives or Cartridges

N. Operate Teletypewriter Terminals

O. Operate on Line Systems

P. Update Manuals

COURSE OUTLINE
(Two Year Program)

DATA ACCOUNTING
SENIOR YEAR

I. PREPARE TAX REPORTS
  A. Prepare Work Area
  B. Prepare Source Documents
  C. Operate Accounting Machine
  D. Operate Programmable Accounting Machine
  E. Operate Data Entry Equipment
    1. Keypunch
    2. Verifier
    3. Sorter

II. MAINTAIN ACCOUNTING CONTROL SYSTEMS
  A. Prepare Work Area
  B. Prepare Source Documents
  C. Operate Data Entry Equipment
  D. Operate Accounting Machine
  E. Write Program
  F. Operate Programmable Accounting Machine
  G. Form a Corporation
  H. Record Capital Stock and Bond Transactions
  I. Prepare Financial Reports

III. PREPARE ENTRIES AND STATEMENTS UNIQUE TO PARTNERSHIPS
  A. Prepare Work Area
  B. Prepare Source Documents
  C. Operate Data Entry Equipment
  D. Operate Accounting Machine
  E. Write program

F. Operate Programmable Accounting Machine

G. Form a Partnership

H. Divide Partnership Earnings

I. Prepare End-of-Fiscal-Period Statements, Forms and Entries

IV. ANALYZE COST DATA

A. Prepare Work Area

B. Prepare Source Document

C. Operate Data Entry Equipment

D. Operate Accounting Machine

E. Write Program

F. Operate Programmable Accounting Machine

G. Analyze Costs for Manufacturing Firm

H. Analyze Costs for Service Firm

I. Prepare End-of-Fiscal-Period Reports, Entries, Statements

V. INTERPRET ACCOUNTING DATA FOR MANAGEMENT

A. Analyze Financial Statements

B. Prepare Statements of Changes in Financial Position

C. Analyze Decision-Making Processes

VI. MAINTAIN AND ESTABLISH DEPARTMENTAL COMMUNICATIONS

A. Process Incoming Mail

B. Process Outgoing Mail

C. Greet and Assist Visitors

D. Collect and Provide Data at Meetings

E. Prepare Miscellaneous Payroll Reports

VII. MAINTAIN PERSONNEL LEVEL

A. Train New Employees

B. Maintain Employee Records

VIII. MAINTAIN SYSTEMS LIBRARY

- A. Store According to Prearranged Order
  - 1. Data Files, Programs, and Documentations
- B. Lend and Receive Data According to a Set Procedure
- C. Maintain Security and Protection of Stored Data

ACCOUNTING & COMPUTING

(Over-riding Strategy for a Sequential Ordering of Instructional Program Content and Meeting the Learning Objectives)

The accounting and computing vocational instructional program shall be a two-year eleventh and twelfth grade program designed to prepare individuals for entry level employment. The instructional program content is based upon an occupational analysis of the accounting field, adjusted to reflect local employment needs and opportunities. Program content will also be adjusted, depending on whether the program is 00, 01, 02, in terms of time available for instruction.

The instructional program content and learning activities are sequenced, based upon a psychological approach to learning, starting the basic accounting cycle, and moving through the more sophisticated concepts of depreciation, accruals, partnerships, corporations, tax, and cost accounting.

Each task to be learned and perfected by the student, will first be demonstrated by the instructor. The student will then perform each task, with very close instructor supervision, allowing learning to continue through the final phase of the instructinal process.

Performance tasks will be demonstrated and taught in blocks. The student will be rotated where necessary, due to equipment constraints. The rotation among the tasks is in accordance with the amount of time assigned to complete a given task.

Evaluation will consist of each student correctly demonstrating the competencies required to complete the assigned task. Student performance will adhere to accepted accounting standards.

Time 1 Lab Period

DUTY:

Record Cash Receipts

TASK 1:

Inspect checks, money orders, drafts, and detailed audit strips

LAB PERFORMANCE KNOWLEDGE:

Inspect for signature

Inspect for proper date

Inspect for endorsement

Compare cash on hand to detail strip

DAILY INSTRUCTIONAL STRATEGY:

Demonstrate how and what to inspect on each form

Give students sample forms to inspect validity and accuracy.

Explain procedure for correcting errors.

Explain how to contact customers whose forms are in error.

_______ Letters

_______ Telephone

INSTRUCTIONAL MATERIALS, EQUIPMENT, AND TOOLS:

Customer checks, money orders, drafts, detailed audit strips, adding machine (at each work station), textbooks, reference books, typewriter

EVALUATION STRATEGIES:

Each student should: satisfactorily perform several inspections

Time 1 Lab period

DUTY:

Record Cash Receipts

TASK 2:

Prepare deposit slips:

LAB PERFORMANCE KNOWLEDGE:

Type deposit slip

List checks, (by ABA number), drafts, money orders, coin, currency, on deposit slip.

Total cash

Total checks

Record account title, number, and date

Check deposit total with cash receipts journal for agreement

Send deposit to bank for deposit

DAILY INSTRUCTIONAL STRATEGY:

Demonstrate similarities and differences in various deposit slips.

Demonstrate preparation of "checks" section, by listing checks separately by ABA number.

Demonstrate placement of account number and other heading information.

Field trip to bank to see bank's role in the deposit (process).

INSTRUCTIONAL MATERIALS, EQUIPMENT, AND TOOLS:

Various deposit slip forms, customer checks, cash, drafts, money orders, adding machine/calculators, textbooks, reference books, rubber stamp typewriter, and bank-deposit bags.

Task 4

Time 2 Lab Periods

DUTY:

Record cash receipts

TASK 4:

Summarize daily cash receipts

LAB PERFORMANCE KNOWLEDGE:

List all remittances.

Record entry in cash receipts journal and check stub

Total daily cash receipts

Compare daily deposit slip

Accumulate total receipts

Accumulate total receipts by account number

Compare total receipts and total receipts by account number

Compare total monthly journal entries to total receipts by account number

File daily deposit slips with remittance advices in proper file unless date entry equipment will be used

DAILY INSTRUCTIONAL STRATEGY:

Demonstrate entry in a cash receipts journal, including A/R credit, sales discount debit, a cash debit.

Demonstrate balancing of cash receipts journal. Verify cash receipts total with amount deposited.

EVALUATION:

Have each student prepare several different deposit slips correctly.

Student should be able to describe, in essay test form, their understanding of the duties involved while handling and transporting the deposit to the bank.

Task 3

Time 4 Lab Periods

DUTY:

Record Cash Receipts

TASK 3:

Process cash and trade discounts

LAB PERFORMANCE KNOWLEDGE: Compute discounts

DAILY INSTRUCTIONAL STRATEGY:

Explain meaning of "trade" and "cash" discounts and reasoning behind each.

Explain various meanings of formulas for computing cash discount.

Actually compute several examples of trade and cash discounts.

Compute cut-off (due) dates for cash discounts.

INSTRUCTIONAL MATERIALS, EQUIPMENT, AND TOOLS:

Customer check, remittance advice stub, copy of company policy regarding discount, calculator or adding maching, textbooks, and other references.

EVALUATION:

Require each student to compute correctly, several various trade and cash discounts, due dates, and net amounts.

INSTRUCTIONAL MATERIALS, EQUIPMENT, AND TOOLS:

- Validated deposit slips attached to remittance advices
- Cash receipts journal
- Adding maching or calculator
- Chart of accounts
- Customer checks

EVALUATION:

- Check for DR=CR in CR journal for each entry.
- Verify amounts.

Task 5

Time 3 Lab Periods

DUTY:

Record cash receipts

TASK 5:

Post-subsidiary ledger

AB PERFORMANCE KNOWLEDGE:

Transfer cash receipts journal entries to subsidiary ledgers

Balance subsidiary ledgers

Run cross check of subsidiary ledgers and daily cash receipts total

Recognize filing system used in sub-sidiary ledgers

DAILY INSTRUCTIONAL STRATEGY:

Stress absolute adherance to set procedure:

Step 1:	Post amount	Step 2:	Calculate balance
Step 3:	Record date	Step 4:	Journal and page in post-reference of ledger
Step 5:	Check mark in post-reference of journal		

INSTRUCTIONAL MATERIALS, EQUIPMENT, AND TOOLS:

Posting device

Subsidiary ledgers

Cash receipts journal

Adding machine

EVALUATION:

Check individual account balances for accuracy in subsidiary ledger.

Reconcile subsidiary total with control total in general ledger.

Task 6

Time 1 Lab Period

DUTY:

Record Cash Receipts

Task 6:

Prepare Source Documents

LAB PERFORMANCE KNOWLEDGE:

Locate source documents

Bring source documents to sorting area

Sort source documents into logically appropriate divisions and order necessary for processing
checks, drafts,money, deposit slip, order journal, cash receipts

File appropriately source documents not needed for the current operations

DAILY INSTRUCTIONAL STRATEGY:

Demonstrate careful handling of the documents after sorting

Demonstrate how to cross-check source documents with open accounts

Explain filing procedures for documents not needed

INSTRUCTIONAL MATERIALS EQUIPMENT AND TOOLS:

Source documents necessary for the operations to be performed, such as payroll records, invoices, checks received as accounts, bills, deposit slips (banking), drafts (copies), and money order (copies)

EVALUATION:

Student will be able to account for each source document with the proper customer account.

Task 7 - A

Time 3 Lab Periods

DUTY:

Record Cash Receipts

TASK:

Operate Data Entry Equipment

LAB PERFORMANCE KNOWLEDGE:

Load cards, check accuracy of punches with card gauge

Analyze data to be keypunched and set beside machine

Determine special codes to be used

Make a program card or put program into machine

Test program card or program

Check space allocation [card design for data given]

Determine special instruction from programmer

Keypunch; make corrections, make new cards

Duplicate damaged cards

File and remove cards from master file

Receive proofread printouts and correct errors

Route work to next station-verify

Clean machines

DAILY INSTRUCTIONAL STRATEGY:

Accounting, career typing, filing, machine operations, data entry equipment

Explain a rotation system to be followed to the entire class (see attached card)

Task 7 - B

Time 3 Lab Periods

DUTY:

Record Cash Receipts

TASKS:

Operate Data Entry Equipment

LAB PERFORMANCE KNOWLEDGE:

Check accuracy of punching with card gauge

Put cards in machine

Source data in order that corresponds to cards

Analyze program card

Determine card layout

Check special codes

Punch cards through

Remove cards to be corrected that have error notch

Correct cards

Replace corrected card in correct sequence

Check for verification notch in all cards

Route data to next station

DAILY INSTRUCTIONAL STRATEGY:

Accounting, career typing, filing, machine operations, data entry equipment

Explain a rotation system to be followed to the entire class (see attached card)

Reinforce any learning from related before rotation begins

Demonstrate to one group at a time the operation of the data entry equipment (keypunch, verifier, sarter) that will be used in the lab.

INSTRUCTIONAL MATERIALS EQUIPMENT AND TOOLS:

Verifier, correction tape, card saw or knife for cleaning jams, ribbon, sand paper file, machine reference manual, source documents, and card layout sheets

EVALUATION:

Evaluate student's accuracy of written and typed accounting work

Test students by means of timed writings on their speed and accuracy in card punching, verifying, and sorting

Test students manipulating skills of the data entry equipment - i.e. placing the program card on the drum.

Reinforce any learning from related before rotation begins

Demonstrate to one group at a time the operation of the data entry equipment (keypunch, verifier, sarter) that will be used in the lab.

INSTRUCTIONAL MATERIALS EQUIPMENT AND TOOLS:

Keypunch [with or without printer], blank cards, correct size and color for particular assignment, card saw-clear jams [prying knife], connection tape, new ribbon in case during the day or work assignment the ribbon needs changing, layout sheets, sand paper file, machine reference manual, IBM, keypunch 024, 026, 029, 129 or Univac equipment, source documents

EVALUATION:

Evaluate student's accuracy of written and typed accounting work

Test students by means of timed writings on their speed and accuracy in card punching, verifying and sorting

Test students manipulating skills of the data entry equipment - i.e. placing the program card on the drum.

Task 7 - C

Time 3 Lab Periods

DUTY:

Record Cash Receipts

TASK:

Operate Data Entry Equipment

LAB PERFORMANCE KNOWLEDGE:

Check timing - replace brush if required and are 8 punch card

Load cards

Determine what is to be sorted

Sort numerically

Sort alphabetically

Use selection switch

Route to next station (programmable accounting machine)

DAILY INSTRUCTIONAL STRATEGY:

Accounting, career typing, filing, machine operations, data entry equipment

Explain a rotation system to be followed to the entire class (see attached cards)

Reinforce any learning from related before rotation begins

Demonstrate to one group at a time the operation of the data entry equipment (keypunch, verifier, sorter) that will be used in the lab.

INSTRUCTIONAL MATERIALS EQUIPMENT AND TOOLS:

Sorter [IBM and photo cells]

Extra brushes

Check cards [cards with 8's punched to check timing]

Reference manuals

Screwdriver [use to replace brushes]

EVALUATION:

Evaluate student's accuracy of written and typed accounting work

Test students by means of timed writings on their speed and accuracy in card punching, verifying and sorting

Test students manipulating skills of the data entry equipment - i.e. placing the program card on the drum

COMMUNICATIONS	MATH	SCIENCE	SAFETY
Telephone: Tactfully contact customers concerning discrepancies Interpret: Company policy, remittance advice stubs, and follow instructions.	operations, i.e. use of parentheses in simplifying arithmetic expressions. Count and placement of decimals Locate by approximation rational numbers and integers on the number line (sequential ordering). Worker: Worker needs intuitive concepts of area and volume Round off decimals and whole number Change percents to fractions and fractions to percents. Find a percent of a number and what percent on number is of another Use of math principles which depend on product of company and method of production. Measures of weight and length. Liquid and dry measures. Compute dates cash discounts would be due, net amount due. Worker must display following personality traits: honesty, reliability,	and relaxation; conscious awareness of physical expressions basic to peak physical performance; conscious awareness of qualities basic to optimal mental performance; Apply point of law on circuit conduction; use simple machines to gain mechanical advantage [card saw is simple lever] Relationship of force to distortion in an elastic body [excessive force shears or bend cards] Resistance of materials to change in shape [excessive force can damage transport mechanisms] Apply basic concept of a completed electrical circuit by having brushes touch	

COMMUNICATIONS

Read:

- Follow instruction procedures e.g. memos, checks, money orders, audit strips, drafts.
- Clearly comprehend all instructions.
- Determine type of source documents sorted.
- Interpreting operational manuals, program languages.
- Comprehension, detail, informational reports, description of mechanism, definition, terminology.

Write:

- Create, write, and type, internal and external reports.
- write legibly, spell correctly, use clear terms, write tactful letters to customers.

Viewing:

- Hand sort checks, (banking) by customer account number.
- Interpretation of operating manuals
- Visual analysis, memory, recognition of symbols, codes, emblems.

MATH

Add/subtract cash - short or over.

Add/subtract - whole numbers or decimal numbers.

Be aware of transposition errors in balancing.

Read and interpret charts, tables and/or graphs.

Use numbers without calculation (source document).

Use binary numbers on reading card for 80, 96, 120 column card

Hindu-Arabic numeral system,

Number/numeral

Place value/expanded notation.

Compare and contrast various base number systems with the decimal numeral system (binary, octal, etc.)

Use positive rationals

Counting

Coding [Hollerith's code, basic math symbol

Ratio

Perform Fundamental operations

Addition, subtraction, multiplication and division algorithms, order of

SCIENCE

Apply workings of phytocells and photodiode to computers; apply the basic electrical current to complete a circuit; simple machines used to gain mechanical advantage [card saw as simple lever]; work input/output, friction and efficiency in simple machines [friction on card transport mechanism] resistance of materials to change in shape; [excessive force damages transport mechanism; avoid excessive sanding of card transport wheels; relationship of force to distortion in an elastic body [excessive force can bend cards]; professionalism: capacity to foster cooperation, to function efficiently when encountering fast changing, multiple, personal or situation variables; exhibit qualities of self-confidence, self-control self-respect, self-reliance and adaptability Attributes of maximum functioning capacity: conscious awareness of the need for a balance between tension

SAFETY

Do not clear card jams unless machine is unplugged

Do not change brushes unless machine is unplugged

Do not lift protective cover while machine is on

Check for broken and damaged cards or damaged plugs

Do not leave machine on for long period of time

Keep long hair out of machine

Lift star wheels before removing drum

Check line cards and plugs for damage

All chips in the chip box must be carefully disposed into trash containers; if used as confetti they can cut a person's eye

Card edges may cut fingers by improper handling

COMMUNICATIONS	MATH	SCIENCE	SAFETY
	perserverance, integrity, loyalty, adaptability, flexibility, confidentiality. Worker must have a workable knowledge of the laws and procedures pertaining to money orders, drafts, cash. e.i. endorsements, discounts, writing, banking system	copper; operation of photo-electrical cells;	

III - Distributive Education – Auto Sales

DISTRIBUTIVE EDUCATION COURSE OF STUDY

The distributive education course of study should be planned each year based on the needs of the students enrolled in the class. A distributive education class may follow a variety of patterns, but usually will be either a general co-op program using an instructional system designed to deal with the needs of all occupational opportunities in marketing, or a specialized program (either co-op or project) designed to train students for a specialized cluster of occupations in one taxonomy area.

In any case, it is important for the coordinator to organize the year to insure preparation for occupations chosen by the student group. The objective of distributive education is to provide a system for dealing with the selected curriculum needs of the students in the distributive education class that year with a flexible method of changing the curriculum plan for a new class the following year. Furthermore, this curriculum plan will be based on task analysis for all the occupations represented in the class. This task analysis will lead to choice of common competencies and individualized competencies for the class. Procedures to accomplish this are:

A. Identify career objectives of individual students (preferably at the junior year level through use of the CIU or other career exploration methods.)

B. Order the IDECC computer print-out for the entire class based on these career objectives.

C. Organize the course of study for the year using available task analysis studies, computer print-out, and specialized curriculum outlines. The year's plan should include:
(see sample class plan attached)

1. Major Units of Class Study
2. Subtopics for each Major Unit
3. Terminal Objectives for Students Involved in Each Subtopic
4. Common Class Competencies Enabling Students to Reach the Stated Terminal Objective
5. Individualized competencies which may be accomplished in small groups or independently based on needs of individual students and related to this Terminal Objective
6. Plot the units of study into the school year dates, giving sequence and time

D. Decide the specific strategies for each major unit by developing or choosing (with student and employer input):

1. appropriate learning activities
2. criterion referenced testing procedures to measure competency mastery
3. individual student contracts for grades
4. employer training plans to assign training responsibilities
5. appropriate resources as needed for IDECC or other activities
6. student competency records

E. Allow students to individualize their learning plans within the major units being covered or those covered previously remembering that:

1. Different students can accomplish more competencies based on their abilities than other students.
2. All students should be given time to master the competencies needed for their career objective.
3. Some students will need to try several learning activities to master a competency while others can learn from only one activity.
4. The teacher becomes a learning manager in an effective instructional system, not the only source of all information.
5. A large variety of learning activities will stimulate class interest and motivate individuals - NOT all strategies should be large group, small group or independent study, but a mix of all three.

F. At the end of each major unit and at the end of the year, the coordinator should evaluate student progress, student goals, instructional goals and instructional strategies to make changes necessary for next year and/or adjustments in the program for the current year.

SAMPLE COURSE OF STUDY

Spitzer High School
Automotive Program 1975-76

This course of study was based on the needs of eighteen senior students who have career objectives in the Automotive and Related Industries. Class meets two hours per day with co-op experience in the afternoon.

Career objectives are as follows:

2	Auto sales person - new
1	Auto sales person - used
2	Truck sales person
1	Recreational vehicle sales
1	Boat sales
1	Airplane sales
2	Motorcycle sales
1	Lease sales manager
2	Auto parts manager
1	Auto parts counter person
1	Auto service manager
1	Auto dealer
1	Zone car distributor
1	District sales representative

The following course outline was designed to serve the needs of the students in the class. It takes into account the strengths and weaknesses of different individuals and their needs for specific career objectives. It includes the review of some topics covered in the general pre-coop junior Distributive Education program with emphasis on their relationship to the automotive field.

I. Orientation

II.* Job Interview
    A. Self Understanding
    B. Job Application
    C. Resumé
    D. Grooming
    E. Job Interview

III. Holding That Job

IV. The Free Enterprise System

V. Economic Concepts (Review of Junior Program)

VI. The Distribution Function (Review)

VII. The Marketing Function (Review)

*Sample

VIII. Merchandising

IX. Mathematics for Marketing, Distribution, and Merchandising

X. Business Organization

XI. Communications

XII. Sales Promotion

XIII. Personal and Business Relations as Related to Automotive Sales Area

XIV.* Business Services
  A. Customer Services
  B. Credit
  C. Service/Warranty

XV.* Salesmanship as Related to Automotive Sales Areas
  A. Prospecting
    1. Finding Customers
    2. Qualifying Customers
  B.* Demonstrations
    1. Show the Product
    2. Features and Benefits
    3. Customer Trial
    4. Guiding the Customer
  C. Closing the Sale
    1. Determine Wholesale Value of Trade
    2. Prepare the Purchase Order
    3. Compute the Total Sale Price

XVI. Product Knowledge – Motor Vehicles, Parts, Accessories

XVII. Business Law as Related to Automotive Sales Areas

XVIII. Inventory Policies

XX. Management

XXI. Planning Your Own Business

*Sample

SAMPLE

EXHIBIT I

Curriculum Section: Job Interview Techniques (September 8 - 19, 1975)

Dates	Learning Units	Terminal Objectives	Common Competencies	Individualized Competencies	Alternative Strategies
9/8	A. Self Understanding	The student will be able to discuss his/her own strengths and weaknesses for a job	HR - 302, 267, 286, 317, 296, 294	None	Use values clarification techniques
9/11 9/12	B. Job Application Form	The student will show ability to fill out job application form to get a job	1. Neat Handwriting 2. Correct Spelling 3. Complete Form 4. Correct Answers	None	Manual - "Getting the Right Job" D.E. Material Lab or Evaluate students' actual applications for jobs or DECA Competitive Activity
9/15	C. Resumé	The student will be able to create his/her own resumé	1. Organization 2. Creativity 3. Appropriate Content	None	
9/16	D. Grooming	The student will choose the appropriate dress and grooming for a job interview	HR - 263	None	Ask health teacher or guidance counselor to speak to class. Film Series: Groomin For The Job Interview.
9/17	E. Job Interview	The student will be able to complete an interview using proper techniques.	-Greeting the Interviewer -Stating your assets -Asking questions -Determining the next step -Evaluating the job possibilities	268, 303 284, 297, 290	Discuss the actual student interview with potential employers to evaluate problem Use video tape for class analysis. DECA Job Interview competitive activity.

SAMPLE

EXHIBIT II.

Curriculum Section: Business Services (February 9 - 20, 1976)

Dates	Learning Units	Terminal Objectives	Common Competencies	Individualized Competencies	Alternative Strategies
2/9	A. Customer Service	The student will be able to explain the importance of customer services to his/her training station	Mgt - 753, 787, 754	Mgt - 780, 785	School Store operations may be used as an alternative to services in a training station
2/11	B. Credit	The student will be able to discuss the use of credit in relation to his/her career objective	O - 736, 735, 601	Op - 683, 737	Students not involved in credit competencies may work on specialized occupational competencies or competencies not finished in previous units
2/12	1. Extending Credit	The student will be able to decide when and how credit may be extended to a customer	None	Op 739, 596, 602 679, 689, 685, 598 Math - 383 Comm. - 135	
2/17	2. Credit Dept. Operations	The student will operate equipment and handle procedures established for operation of the credit department of his/her training station	None	Op - 686, 599 595, 688, 600, 680 738 Comm. - 118, 128 134	
2/18	3. Collecting Overdue Accounts	The student will be able to develop procedures for collection of charge accounts	None	Op - 594, 687, 597, 603, 681, 684, 682	
	C. Service Warranty				

SAMPLE

EXHIBIT III

Curriculum Section: Salesmanship (February 23 - April 30, 1976)

Dates	Learning Units	Terminal Objectives	Common Competencies	Individualized Competencies	Alternative Strategies
3/1 - 3/8 1976	B. Demonstration 1. Show the Product a. Know the Inventory b. Select Acceptable Product c. Introduce Customer to Product d. Techniques of Trading - up.	The student will be able to present the product based on the customers needs.	*Note: The following competencies will be separated after the computer printout is received Selling Lp 33 - 40		Observe a professional sales person Write a Training Sales Manual
3/10 - 3/12 1976	2. Features and Benefits of the Product a. Maintain product knowledge b. Demonstrate features and benefits	The student will be able to translate features into benefits	Lp 41, 44, 42 Selling		
3/17 - 3/26 1976	3. Customer Trial a. Check auto for saleable condition b. Obtain proper keys and stock number c. Determine route d. Re-examine benefits	The student will be able to explain by example the importance of the demonstration ride.	Selling Lp 43, 45 46, 51		
3/29 - 3/31 1976	4. Guiding the Customer a. Take charge of the sale b. Identify and overcome objectives c. Reconfirm the customers committment to buy	The student will be able to guide the customer through the decision making process.	Selling Lp 49, 50, 52, 53		
	C.				

IV - Health – Medical Assisting

INSTRUCTIONAL STRATEGY

Related classroom instruction is based on lecture/discussion (type) lessons which are reinforced through the use of assignment sheets and information sheets. Visual aids covering microorganisms, wrapping techniques, terminology, bacteriology theory,and sterilization equipment and procedures, are used for reinforcement of student learning. Classroom demonstrations of culture growth and bulletin board preparation are used for student activities.

Lab experience is provided by the use of demonstrations in each of the different types of work stations. Students then progress through the work stations using check sheets of the procedures used to develop performance proficiency. Safety is an inherent part of the lab experience and is reinforced through the use of students acting on equipment and safety supervisors.

Student proficiency progress is followed through the use of progress charts. Lab activity sheets are used for daily learning feedback for individualized student reinforcement.

Students that are advanced in the procedures used in this module act as peer instructors or use the time for performance proficiency development in the other areas that have been taught previously.

MANAGEMENT STRATEGY

Facility: Storage areas will be provided for instruments, supplies, and chemicals. Four sinks and thirty-two feet of counter top will provide work stations for nineteen students; boiling, chemical and autoclave equipment will provide work stations for six students. Electricity is required for boiling and autoclave equipment.

Equipment: An adequate laboratory would consist of four sinks, eight wrapping stations, two autoclave units, two chemical sterilizers, eight transfer forcep stations and one boiling station; completely equipped with the necessary small instruments and supplies.

Students: The students who have difficulty with a particular module can return to that module or station at a later date for proficiency development. This will insure that a slow student will not monopolize a single station for an extended period of time.

Rotation: The autoclave, boiling and chemical sterilization stations are semi-automated. Students should be assigned to the practice of transfer forceps, wrapping or other duties during the waiting time.

The transfer forceps and wrapping skills and developed through extended student practice. This practice can take place on a regular basis during the remainder of the junior and senior years.

LOGISTICAL CONSIDERATIONS:

Students will be oriented to the expected student outcomes, laboratory rotation techniques and the need for extended skill development through practice. Students will be familiarized with the evaluation processes that will be used in the laboratory and related classrooms.

The more advanced students will be assigned to the more difficult module or station first and then rotated to the other stations.

As the more advanced students complete the module, they will be utilized to provide assistance to the slower students.

A personnel management system will utilize a laboratory supervisor, equipment supervisor and safety supervisor. The students assigned to these positions will afford assistance to the students and teachers.

EVALUATION STRATEGY

Daily:

Related

1. Question students for principles and methods
2. Create sample cases for student demonstration of technique selection
3. Check assignment sheets for content and reasoning

Laboratory

1. Examine student's sterilized instruments
2. Verify student self-check using sterilization indicators
3. Rotate peer assistants in autoclave technique
4. Observe student performance in procedures and techniques
5. Check student-written brief activity report
6. Review performance record with student

Weekly/Bi-weekly:

Related

1. Administer objective guizzes
2. Examine student's schematic labeling of equipment
3. Verify student temperature chart and time table
4. Question student on instrument identification – written/oral

Laboratory

1. Observe student progress on procedure and selection of sterilization method
2. Chart student progress

Block Evaluation:

Related

1. Administer objective test
2. Administer sample cases

Laboratory

1. Observe student performance on preparation techniques

2. Observe student performance on sterilization techniques

BEHAVIORAL OBJECTIVES

The student, given the necessary instruments, supplies, and sterilization equipment, will by the end of the sterilization module, be capable of explaining and demonstrating skills of:

1. Purpose of sterilization
2. Sterilization of instruments by the process of boiling, chemical and autoclaving
3. Washing and wrapping of instruments
4. Use of transfer forceps
5. Care, cleaning, and storage of equipment and supplies

Prior to the cooperative phase of the program, the student will be capable of performing the entry level skills of the sterilization process.

Lab	Related
	ORIENTATION

ORIENTATION

Bacteriology

1. Orientation

2. History of bacteriology
  a. Leeuwenhoek
  b. Pasteur
  c. Lister
  d. Semmelweis
  e. Holmes
  f. Koch

3. Microbiology
  a. bacteria
    I. description
    II. reproduction process
    III.chromophilic properties

  b. Types of bacteria
    I. Cocci
      A. Staphylococci
      B. Shliplococci
      C. Streptococci

    II. Bacilli
      A. Pathogenic history

    III.Spirilla
      A. Pathogenic history

    IV. Spares
      A. Description
      B. Hazard

  c. Rickettsiae
    I. Pathogenic history

  d. Viruses
    I. Pathogenic history
    II.Description

  e. Fungi
    I. Description

4. Principles of sterilization
  a. Body resistance to pathogenic bacteria
    I. Natural immunity

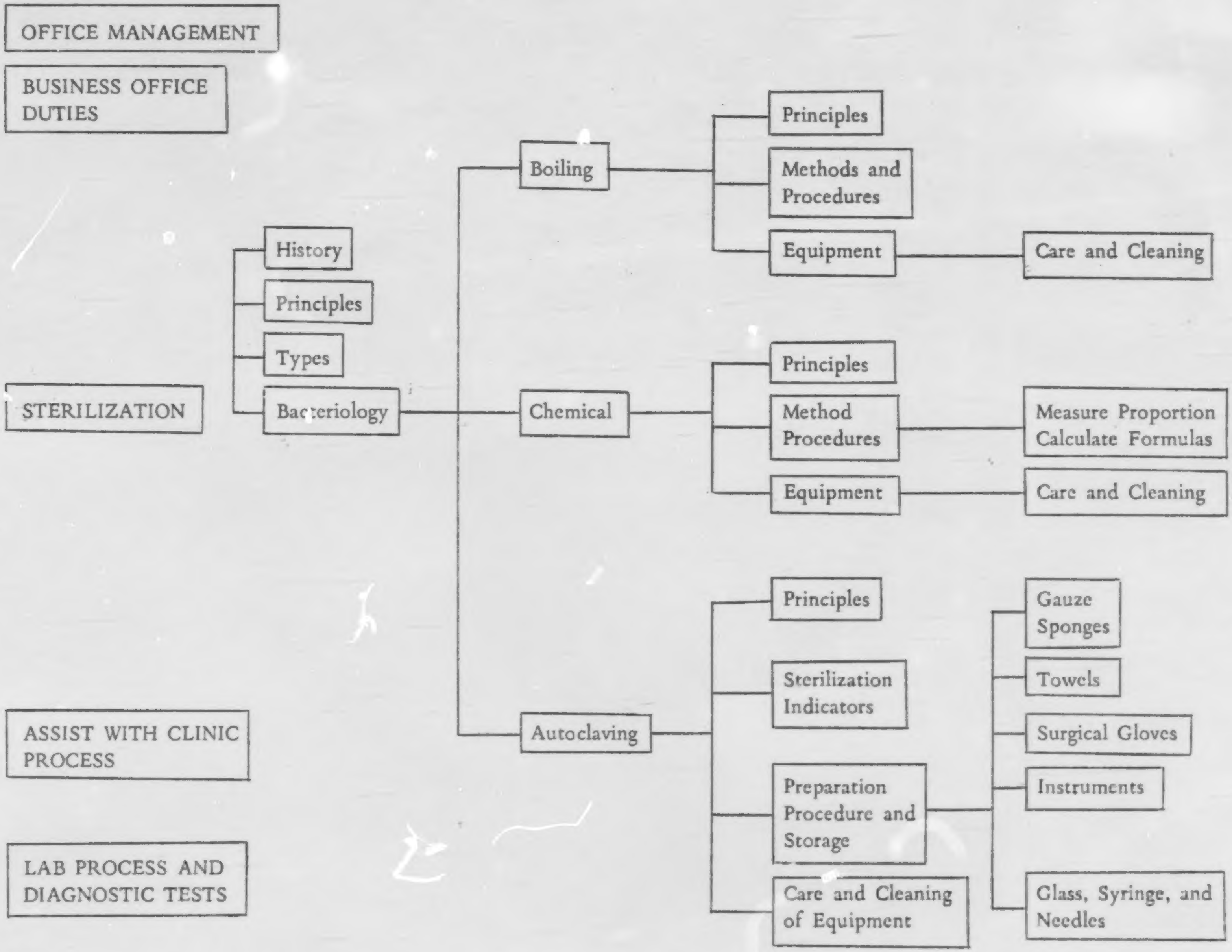
Lab	Related
	II. Acquired immunity
	b. Transmission
	c. Personal hygiene
	d. Importance of rigid aseptic technique
	I. Hazards
	e. Terminology
	I. Definition
	f. Purpose of sterilization
	g. Medical legal implications
1. Sterilize with boiling water	1A. PRINCIPLES OF STERILIZATION BY BOILING WATER
	1. Indications - Contraindications
	2. Equipment
	3. Procedure and technique
	a. Syringes
	b. Needles
	c. Instruments
	d. Blunt Instruments
	e. Glassware
	f. Enamel and stainless steel ware
	g. Rubber goods
	4. Safety
	5. Care of equipment
	6. Aftercare of materials
	7. Precautions
2. Clean water sterilizer	2A. CLEANING TECHNIQUE
	1. Indications
	2. Procedure
3. Sterlize with chemicals	3A. PRINCIPLES OF STERILIZATION WITH CHEMICALS
	1. Indications
	2. Procedure and technique
	3. Chemical Sterlizers
	a. Types
	b. Action
	c. Calculation of dilutions (percentages)
	4. Safety
	5. Care of equipment
	6. Precautions
4. Clean chemical sterlizing equipment	4A. CLEANING TECHNIQUE
	1. Indications

Lab	Related
	2. Procedure
5. Operate autoclave	5A. PRINCIPLES OF STERLIZING WITH AUTOCLAVE 1. Define 2. Types 3. Principles of steam under pressure 4. Compare steam under pressure; boiling water and chemical methods 5. Safety 6. Sterilization indicators a. Definition b. Effects of moist heat on specially prepared dyes 7. Positioning of loads 8. Care of equipment
6. Prepare and autoclave gauze sponges	6A. PREPARE AND AUTOCLAVE GAUZE SPONGES 1. Technique for wrapping and securing a. appropriate materials 2. Technique for preparation [illegible] a dressing can 3. Identification of contents 4. Procedure for autoclaving a. Loading b. Time and temperature calculation 5. Safety 6. Storage procedure
7. Fold and Autoclave towels	7A. PRINCIPLES OF FOLDING AND AUTOCLAVING TOWELS 1. Method 2. Labeling technique 3. Procedure and technique 4. Safety
8. Wash and wrap surgical gloves	8A. PRINCIPLES OF WASHING AND WRAPPING SURGICAL GLOVES 1. Care of rubber goods 2. Procedure 3. Labeling technique 4. Safety 5. Disposable gloves
9. Autoclave surgical gloves	9A. PRINCIPLES OF AUTOCLAVING SURGICAL GLOVES

Lab	Related
	1. Procedure 2. Effects of heat on rubber goods 3. Safety 4. Storage
10. Prepare and wrap instruments	10A. PRINCIPLES OF WASHING AND WRAPPING INSTRUMENTS 1. Care of instruments 2. Procedure for washing a. Precautions 3. Procedure for wrapping 4. Labeling techniques 5. Safety
11. Autoclave instruments	11A. PRINCIPLES OF AUTOCLAVING INSTRUMENTS 1. Procedure 2. Safety 3. Storage
12. Prepare and wrap glass syringes and needles	12A. PRINCIPLES OF WASHING AND WRAPPING GLASS SYRINGES AND NEEDLES 1. Types 2. Care of syringes 3. Care of needles 4. Procedure for washing 5. Procedure for wrapping 6. Labeling technique 7. Safety 8. Disposable
13. Autoclave glass syringes and needles	13A. PRINCIPLES OF AUTOCLAVING GLASS SYRINGES AND NEEDLES 1. Procedure 2. Safety 3. Storage
14. Lift with transfer forceps	14A. PRINCIPLES OF LIFTING WITH TRANSFER FORCEPS 1. Types utilized 2. Indications 3. Types of chemicals 4. Procedure and technique 5. Principles of asepsis 6. Safety 7. Care of equipment

Basic learning time block	Washing and wrapping	Autoclave Sterilization Transfer forceps	Boiling sterilization Care, cleaning and storage of equipment Care and storage of supplies Chemical sterilization
Group 1 DAY 1	1	[illegible]	3
Group 2 DAY 2	3	1	2
Group 3 DAY 3	2	3	1

Each group has eight students. One student absent.


OFFICE MANAGEMENT
BUSINESS OFFICE DUTIES
STERILIZATION
History
Principles
Types
Bacteriology
Boiling
Principles
Methods and Procedures
Equipment
Care and Cleaning
Chemical
Principles
Method Procedures
Measure Proportion Calculate Formulas
Equipment
Care and Cleaning
Autoclaving
Principles
Sterilization Indicators
Preparation Procedure and Storage
Care and Cleaning of Equipment
Gauze Sponges
Towels
Surgical Gloves
Instruments
Glass, Syringe, and Needles
ASSIST WITH CLINIC PROCESS
LAB PROCESS AND DIAGNOSTIC TESTS

V - Home Economics – Baking

VOCATIONAL HOME ECONOMICS SECTION

PLANS FOR DEVELOPING LOCAL COURSES OF STUDY IN JOB TRAINING PROGRAMS

Presented by:

Laura Pernice, Coordinator of Job Training
Kathy Voorhies, Supervisor Vocational Home Economics

June 11, 1975

PATTERN
FOR
COURSE OF STUDY

I. INTRODUCTION

- A. Nature of the course
  - 1. Skills which are developed
  - 2. Knowledges which are taught
  - 3. Changes in behavior which are expected
- B. Grade level and time
  - 1. Grade level that the course is designed for
  - 2. Amount of minutes per day alloted for the class
  - 3. Amount of days per week that the class meets
  - 4. Amount of weeks per term or scholastic semester that the class will require

II. EDUCATIONAL PHILOSOPHY

- A. Philosophy of school
- B. Philosophy for Food Service Program

III. COURSE OUTLINE

- A. Outline of major instructional blocks for total program
- B. Selected instructional blocks for junior or senior program; detailed and sequenced by order of instruction

IV. COURSE OBJECTIVES

- A. Short introductory paragraph explaining the rationale for selecting objectives
- B. List of objectives

V. PLAN OF INSTRUCTION

- A. Design for operating the laboratory and related class
  - 1. Yearly time line
  - 2. System for charting work stations
  - 3. Student rotation chart for laboratory
  - 4. Related class: time line for common knowledge

B. Design for organizing instructional content of laboratory and related class
  1. Performance objectives
  2. Format for laboratory and related class

C. Four week menu cycle

D. Lesson plan format (to be developed)
  1. Objectives
  2. Procedures
  3. Resources
  4. Evaluation

PARK COUNTY JOINT VOCATIONAL SCHOOL

Course of Study
for
Junior Food Service
(09.0203)

Penny Popover, Instructor
1975

I. INTRODUCTION

A. Nature of Course

The purpose of the junior year of the Job Training Food Service Program is to develop basic skills in quantity food preparation, serving, sanitation practices, safety regulations, and management procedures related to operating the cafeteria Type A and Ala Carte lines.

B. Grade Level and Time

This is the first year of a two-year sequence and is open to high school students sixteen years of age or older who have selected Food Service as an occupational choice. Class meets 22.5 hours per week; 7.5 hours related instruction, 15 hours practical laboratory experience. The school is in session 181 days. Successful completion requires 80% attendance of the course. The junior cafeteria facility operates five days per week and is open to the student body and faculty. Related and laboratory production are scheduled as follows:

Monday	Tuesday	Wednesday	Thursday *	Friday
Cafeteria Production (3 hours)	Cafeteria Production (3 hours)	Cafeteria Production (3 hours)	LAB 3 hours Skill Development Demonstration Field Trips	Cafeteria Production (3 hours)
Related (90)	Related (90)	Related (90)	Related (90)	Related (90)

*Thursday represents a skill development laboratory during which the juniors do not have responsibility for the cafeteria, although the actual day chosen is optional.

II. EDUCATIONAL PHILOSOPHY

A. Philosophy of School:

Park County Joint Vocational School accepts on quota from home schools any students interested in one of the vocational offerings giving each a first, second, and third choice option. The school's primary function is to provide each student entry level skills to obtain employment in an occupational training field. Programming is kept relevant to community business and industry needs through the use of advisory committees and analysis of local manpower needs.

B. Philosophy of Food Service Program:

Food Service is the third largest manpower industry in the United States. It provides annual employment opportunities for five hundred workers within the Park County Joint Vocational School District of which approximately 85% require training. The philosophy of the Food Service Program is to provide students with skills, technical knowledge, and work attitudes to enable them to seek, hold, and advance in food service jobs available in the area.

III. COURSE OUTLINE

A. The following blocks comprise the two-year program for the Food Service Worker. Block titles given to customers of task statements taken from occupational analyses.

Baker
Beverage and Snack Bar Worker
Chef, Head Cook, Entree Cook
Dessert Cook
Food Production Supervisor
Pantry Cook - - Salad Maker
Pantry Cook - - Sandwich Maker
Short Order Cook
Soup and Vegetable Cook
Storeroom Manager
Cafeteria Counter Worker
Cashier
Host/Hostess
Restaurant Manager
Waiter's Assistant
Waiter/Waitress
Maintenance and Sanitation
Menu Design
Purchasing and Cost Accounting
Quantity and Cost Control
Dietary Aide

B. Blocks selected for the Junior Program

Based on the cafeteria as the laboratory, the Junior Food Service Program is divided into the following blocks of instruction:

*Baker

Cookies: drop, bar, refrigerated
Quickbreads: biscuits
Cakes: sheet cakes, doughnuts

Icings, frostings, glazes
Yeast breads: sweet rolls, dinner rolls, pizza shells
Pastry: pie crust
Pies: fruit, cream, main dish
Meringue

Beverage and Snack Bar Worker
Pantry Cook: Salad Maker
Pantry Cook: Sandwich Maker
Short Order Cook
Cafeteria Counter Worker
Dessert Cook
Maintenance and Sanitation
Storeroom Manager
Entree Cook
Soup/Vegetable Cook
Cashier

A. Design for operating the laboratory
  a. Rotation plan
  b. Student rotation chart

B. Design for organizing instructional content of laboratory and related
  a. Listing of general behavioral objectives
  b. Format for laboratory and related class content
  c. Yearly time line

C. Listing of general behavioral objectives by block of instruction

D. Arrangement of blocks and content into weekly and daily instruction plan

*Each block should have specific content similarly detailed

IV. COURSE OBJECTIVES

A. Because of the nature of the Food Service Industry, students have the opportunity to be placed in many entry level positions requiring a comprehensive background of safety and sanitation procedures, basic food preparation techniques, equipment operation, and work attitudes.

B. The overall objectives of the Junior Food Service Program are to enable the student to:

1. Acquire knowledge and specialized skills pertaining to institutional food preparation. Through classroom instruction, demonstrations, and practical experiences, students learn quantity food production by preparing foods using a variety of cooking methods, performance procedures, and types of equipment. By following standard formulas accurately and using efficient operational techniques, students learn to produce quality products.
2. Use safety practices in operating institutional equipment. Through classroom instruction and demonstration, students learn the importance of safety in work importance and the responsible use of tools and equipment.
3. Practice standards of sanitation in food preparation and serving including the care of foods, tools, utensils, equipment, and surfaces.
4. Become aware of careers in Food Service and the possibilities for advancement in the industry.
5. Practice standards of personal care and attitudes of human relations through services to the public, classroom activities, and group processes in order to relate to supervisors, clientele, and peers, in maintaining and advancing on the job.
6. Learn and use scientific, mathematic, and mechanical principles as they apply to Food Service.
7. Develop qualities of leadership and attitudes of community responsibility through FHA-HERO (Home Economics Related Occupations) Youth Organization.

8. Apply principles of time, money, and energy management to the production of foods including purchasing and storing supplies and equipment, record keeping, meal planning, and serving practices.

V. PLAN OF INSTRUCTION

A. Design for operating the laboratory and related class for 36 weeks

1. Yearly time line: 1975 - 1976

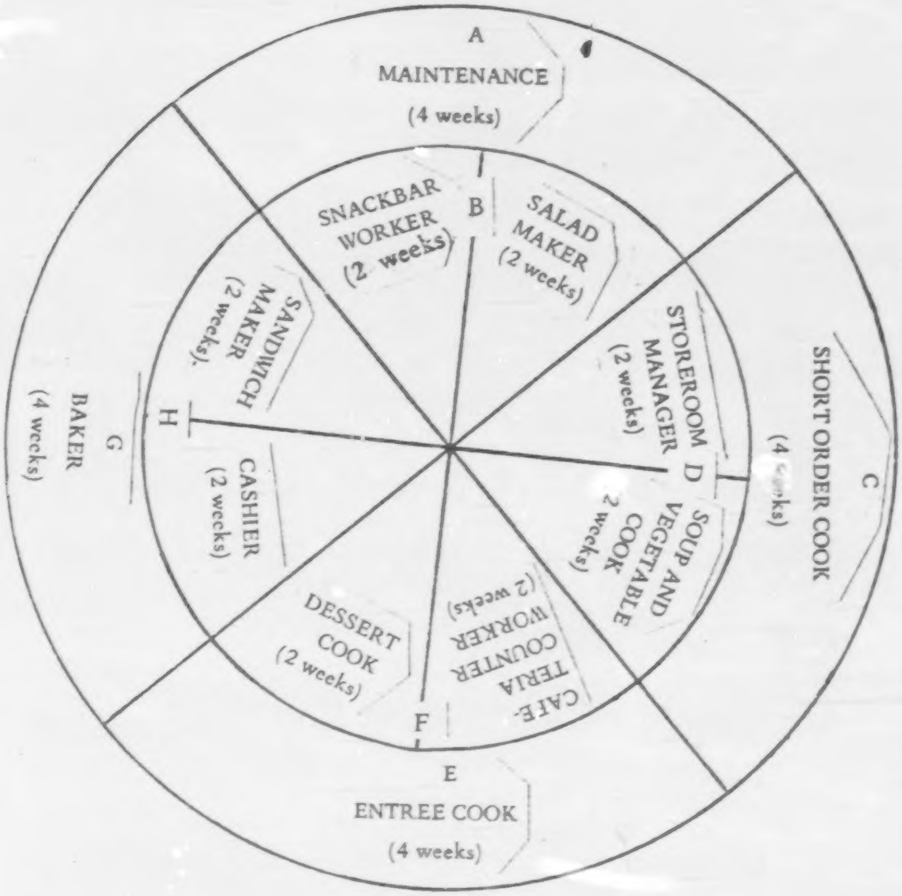
Sept. 3 to Sept. 19	ORIENTATION 4.5 hours daily

	LABORATORY: 3 hours												RELATED CLASS: 90 minutes												
													Common Knowledge: 45 min.	Technical Knowledge: 45 minutes											
													Group Instruction	Individualized instruction by work station											
	Maintenance	Snackbar Worker	Salad Maker	Short Order Cook	Storeroom Manager	Soup and Vegetable Cook	Entree Cook	Cafeteria Counter Worker	Dessert Cook	Baker *	Cashier	Sandwich Maker		Maintenance	Snackbar Worker	Salad Maker	Short Order Cook	Storeroom Manager	Soup and Vegetable Cook	Entree Cook	Cafeteria Counter Worker	Dessert Cook	Baker *	Cashier	Sandwich Maker
Sept. 22 to May 21																									

May 24 to June 4	CLOSING ACTIVITIES 4.5 hours daily

*Baker block was selected to be detailed as the model example. The remaining eleven blocks should be similarly detailed.

2. System for charting work stations - 32 weeks


A
MAINTENANCE
(4 weeks)
B
SNACKBAR WORKER
(2 weeks)
SALAD MAKER
(2 weeks)
C
SHORT ORDER COOK
(4 weeks)
D
STOREROOM MANAGER
(2 weeks)
SOUP AND VEGETABLE COOK
2 weeks)
E
ENTREE COOK
(4 weeks)
F
CAFE-TERIA COUNTER WORKER
(2 weeks)
DESSERT COOK
(2 weeks)
G
BAKER
(4 weeks)
H
SANDWICH MAKER
(2 weeks).
CASHIER
(2 weeks)

a. work stations A, C, E, G, represent major blocks of four weeks duration.
b. work stations B, D, F, H, represent a combination of two minor blocks, each two weeks in duration for a total of four weeks.
c. after four weeks, students assigned to block A maintenance, are rotated to block B. During the second four week period, the students will have the equivalent of two weeks instruction in Snack Bar Worker and two weeks instruction in Salad Maker.

3. Student rotation chart for laboratory 1975 - 1976

Class Members

1.	Tony	7.	Suzie	13.	Peggy	19.	Ralph
2.	Jim	8.	Nancy	14.	Stan	20.	Karen
3.	Alice	9.	Jane	15.	Betty	21.	Barbara
4.	Jo	10.	Mike	16.	Lillie	22.	Jeff
5.	Jack	11.	Kelly	17.	Beth	23.	Chris
6.	Pete	12.	Ann	18.	Margie	24.	John

	A	B	C	D	E	F	G	H
Dates	Maintenance	Snackbar Worker Salad Maker	Short Order Cook	Storeroom Manager Soup/Veg. Cook	Entree Cook	Cafeteria Counter Worker Dessert Cooker	Baker	Cashier Sandwich Maker
Sept. 3	Orientation and							
Sept. 19	Opening Activities							
Sept. 22	1	4	7	10	13	16	19	22
	2	5	8	11	14	17	20	23
Oct. 17	3	6	9	12	15	18	21	24
Oct. 20	22	1	4	7	10	13	16	19
	23	2	5	8	11	14	17	20
Nov. 14	24	3	6	9	12	15	18	21
Nov. 17	19	22	1	4	7	10	13	16
	20	23	2	5	8	11	14	17
Dec. 12	21	24	3	6	9	12	15	18
Dec. 15	16	19	22	1	4	7	10	13
	17	20	23	2	5	8	11	14
Jan. 23	18	21	24	3	6	9	12	15
Jan. 26	13	16	19	22	1	4	7	10
	14	17	20	23	2	5	8	11
Feb. 20	15	18	21	24	3	6	9	12
Feb. 23	10	13	16	19	22	1	4	7
	11	14	17	20	23	2	5	8
March 19	12	15	18	21	24	3	6	9
March 22	7	10	13	16	19	22	1	4
	8	11	14	17	20	23	2	5
April 15	9	12	15	18	21	24	3	6
April 26	4	7	10	13	16	19	22	1
	5	8	11	14	17	20	23	2
May 21	6	9	12	15	18	21	24	3
May 24	closing							
June 4	activities							

4. Related class: Time line for common knowledge

Date	Group Instruction - 45 minutes		
	Content	Math Concepts	Science Concepts
*Sept. 3	General overview to school, program procedures, and food service industry.		
Sept. 4 ↓ Sept.19	Personal hygiene, uniforms, state, local, city regulations	Use of tape measure: addition , fractions	Bacteria and micro/ organisms: growth, control
Sept. 22 ↑	Week one of rotation Safety and managing cooking equipment: oven, ranges, mixers, dishwashers		friction variation heat transfer

Group instruction for 45 minutes of the 90 minutes related is composed of knowledge common to all blocks. This will include segments of information about sanitation; measurement; laws and regulations; how to apply for, get, and hold a job; HERO; etc. Specific information regarding measurement, sanitation and so forth related to a single block is not taught during this 45 minute period but comprises the information taught by individualized instruction during the second 45 minutes of related class.

↓

June 4

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*From September 3 - 19 students are given general orientation for 4.5 hours daily with no cafeteria involvement.

B. Design for organizing instructional content of laboratory and related class.

Baker

1. Performance Objectives:

On completion of the Baker Cycle, the student will be able to:

a. Read and follow basic recipe directions, make substitutions and recipe variations, enlarge for quantity production, and standardize portions for cost control.

b. Use correct procedures to weigh and measure ingredients for quantity baking.

c. Practice sanitary techniques and safety procedures in baking, storage of food and supplies, and maintenance of equipment.

d. Use correct techniques and equipment for preparing:

1. cookies: drop, bar, refrigerated
2. quick breads: biscuits
3. cakes: sheet cakes, doughnuts
4. icings: frosting, glazes
5. yeast breads: sweet rolls, dinner rolls, pizza shells
6. pastry: pie crust
7. pies: fruit, cream, main dish
8. meringue

C. Four Week Menu Cycle
(Baker products slotted in only)

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	Choc. Chip Cookies	Brownies		Pinwheels Pecan Sandies	Creamed chicken on biscuits
Week 2		Spice cake	Cake doughnuts		Pepperoni-cheese pizza
Week 3			Sloppy Joes		Sweet rolls
Week 4	Beef pot pie		Cherry pie Apple pie		Banana cream pie Lemon meringue pie

D. Daily lesson plan format

(to be developed)

2. Format for laboratory and related class.

In the period of a four week cycle, skills proceed from simple to complex in the basic bakery items that could be taught through the cafeteria program.

LABORATORY: 3 hours
(Cafeteria Kitchen)

	Skills	Materials, Supplies Equipment, Objects	Safety Hazard Cues
Week 1			
*M.	Make up drop cookies	formula	lifting of weights
1.	Read formula	scales	burns
	Pre-heat oven	calibrated container	electrical shocks
	Gather equipment	mixers	mixer beaters
	Gather ingredients	utensils (spoons, spatula)	spills
	Measure ingredients		fire hazards
	Mix ingredients	oven	slips/falls
	Scale and portion	work bench	foreign objects in foods
	Prepare pans	baking pan	
	Process dough	pan papers (silicone)	
	Load pan oven		
	Bake	ingredients	
	Remove	scoop	
	Cool	cooling rack	
	Prepare for sale or storage	gloves packaging materials	
	Clean up	(when necessary)	
T.	Make up bar cookies (repeat one above)		
W.	Make up refrigerator cookies (repeat one above)		
TH.	Learning Lab Reinforce weighing/ measuring skills and portion control		
F.	Make up biscuits for main dish		
Week 2			
M.	Make up sheet cakes		
T.	Frost and finish sheet cakes		
W.	Make up cake doughnuts from mix Demonstrate yeast bread dough Make up pizza dough for Friday		
TH.	Learning Lab Review and re-do non-standard cakes		
F.	Make up pizza shells		
Week 3			
M.	Make up hamburger bun dough		
T.	Shape and bake hamburger buns		
W.	Make up sweet roll dough		
TH.	Learning Lab Practice variation of sweet roll shapes		
F.	Bake and glaze sweet rolls		
Week 4			
M.	Make up pie pastry for main dish		
T.	Make up pastry and line dessert pie pans		
W.	Make fruit pie fillings, finish pies		
TH.	Learning Lab Make up cream pie filling Make up egg foam meringue		
F.	Make up cream pies and finish		

RELATED CLASS: 45 minutes
(Individualized Technical)

	Content	Math Concepts	Science Concepts
M.	Baking terminology abbreviations		
	Recipe interpretation	Formula conversion equivalents	
	Purpose of ingredients		Action of leaveners: Baking powder Baking soda
T.			
W.			
TH.			
F.			

*Monday of week one is an example of the way in which all skills should be detailed. The purpose of detailing is to insure the inclusion of essential knowledge in laboratory and related class instruction.

VI - Trade and Industrial – Auto Mechnic

INSTRUCTIONAL BLOCKS

JUNIOR YEAR		SENIOR YEAR	
General Service	3 weeks	Electrical	10 weeks
Engine	9 weeks	Suspension	5 weeks
Cooling	1 week	Power Train	8 weeks
Electrical	4 weeks	Heating and Ventilation	6 weeks
Brakes	5 weeks	Accessories	2 weeks
Fuel and Exhaust	5 weeks		

Junior Year

Nine weeks remained at the end of the junior year to permit an open job shop concept, providing students with live customer work related to any or all modules previously covered during the junior year. Related class time during this nine-week period will include review, customer relations, employer/employee relations, attitudes and introductory senior year related information.

Senior Year

During the senior year an open job shop concept will be maintained to provide students with opportunities to practice previously learned tasks and become proficient on newly acquired new tasks.

COURSE OUTLINE

JUNIOR YEAR

GENERAL SERVICE

1. Keep shop records
2. Write a repair order
3. Maintain customer relations
4. Obtain information from service manuals
5. Change engine oil
6. Lubricate a vehicle
7. Safety inspection
8. Repack front wheel bearings
9. Check lights
10. Replace fan belt
11. Rotate tires
12. Repair a tire
13. Balance a tire
14. Solder a connection
15. Basic cuts and welds with acetylene
16. Drill a hole
17. Tap or cut threads - internal/external

ENGINE

1. Diagnose engine problems
2. Clean engine
3. Check compression
4. Check oil pressure
5. Adjust valves
6. Repair engine oil leaks
7. Remove and replace an engine
8. Remove and replace valve stem seals
9. Remove and replace cylinder head
10. Grind valves

11. Repair valve guides
12. Remove and replace filters
13. Remove and replace oil pump
14. Remove and replace bearing inserts
15. Remove and replace main seals
16. Remove and replace pistons and rods
17. Change piston rings
18. Change piston pins
19. Remove and replace crankshaft
20. Remove and replace timing chain
21. Remove and replace camshaft
22. Overhaul an engine

COOLING

1. Diagnose cooling system problems
2. Perform a pressure test
3. Test and/or install anti-freeze
4. Flush cooling system
5. Remove and replace fan belts
6. Remove and replace engine fan
7. Remove and replace hoses
8. Remove and replace radiator
9. Remove and replace thermostat
10. Remove and replace water pump
11. Install core plugs
12. Remove and replace heater core

ELECTRICAL

1. Diagnose electrical system problems
2. Service battery
3. Test battery

4. Remove and replace battery cable
5. Remove and replace starter
6. Remove and replace generator
7. Remove and replace alternator
8. Remove and replace plugs
9. Remove and replace points/condenser
10. Set engine timing
11. Replace bulbs
12. Test and repair wiring

BRAKES

1. Adjust brake
2. Bleed brake system
3. Remove and replace brake drum
4. Remove and replace wheel bearings
5. Remove and replace brake shoes
6. Remove and replace wheel cylinder
7. Overhaul a wheel cylinder
8. Remove and replace brake line
9. Remove and replace brake pad
10. Overhaul a caliper
11. Overhaul power brake unit
12. Remove and replace a master cylinder
13. Overhaul a master cylinder
14. Remove and replace the emergency brake
15. Repair brake lights
16. Remove and replace a power brake unit
17. Turn and/or grind brake drums
18. Turn and/or grind a brake disc
19. Diagnose brake system problems

FUEL AND EXHAUST

1. Diagnose exhaust system problems
2. Remove and replace tail pipe

3. Remove and replace muffler
4. Remove and replace exhaust pipe
5. Remove and replace catalytic converter
6. Diagnose fuel system problem
7. Remove and replace air cleaner and/or service
8. Remove and replace a fuel filter
9. Test fuel pump
10. Remove and replace a fuel pump
11. Remove and replace a fuel line
12. Remove and replace a gas tank
13. Service gas tank gauge
14. Remove and replace a carburetor
15. Overhaul a carburetor
16. Service emission control components
17. Adjust a carburetor
18. Perform exhaust analysis

SENIOR YEAR

ELECTRICAL

1. Analyze ignition system with a scope
2. Analyze electronic ignition system
3. Perform a major tune-up
4. Analyze electrical system with a scope
5. Troubleshoot starting system
6. Overhaul a starter
7. Troubleshoot generator system
8. Overhaul a generator
9. Troubleshoot alternator system
10. Overhaul an alternator
11. Remove and replace a charging system regulator
12. Adjust a charging system regulator
13. Troubleshoot electrical accessory system
14. Service and/or replace printed circuit panels

SUSPENSION

1. Diagnose suspension system problems
2. Repair and replace shock absorber
3. Align front end
4. Align rear end
5. Replace ball joint
6. Repair and/or replace coil springs
7. Remove and replace leaf spring
8. Repair and/or replace torsion bar
9. Remove and replace sway bars
10. Remove and replace upper or lower control arm
11. Remove and replace steering box
12. Repair standard steering
13. Repair power steering
14. Service steering linkage
15. Remove and replace steering column

POWER TRAIN

1. Diagnose power train problems
2. Remove and replace a drive shaft
3. Remove and replace a U joint
4. Adjust a clutch
5. Remove and replace a standard transmission
6. Remove and replace a clutch assembly
7. Adjust standard transmission linkage
8. Overhaul a standard transmission
9. Diagnose automatic transmission hydraulic system
10. Adjust automatic transmission bands
11. Adjust automatic transmission linkage
12. Remove and replace an automatic transmission
13. Remove and replace transmission seals
14. Overhaul automatic transmission

15. Remove and replace an axle
16. Remove and replace an axle bearing
17. Remove and replace a third member
18. Remove and replace a differential bearing
19. Overhaul a differential assembly

HEATING, VENTILATION, AND AIR CONDITIONING

1. Diagnose heating, ventilation and air conditioning problem
2. Remove and replace fan belts
3. Charge air conditioning system
4. Remove and replace air conditioning compressor seals and bearings
5. Remove and replace hoses
6. Remove and replace dryer
7. Remove and replace condenser
8. Remove and replace evaporator
9. Remove and replace control valves
10. Service vent control system
11. Remove and replace fan motors

ACCESSORIES

1. Service horn
2. Service turn signals
3. Service courtesy lights
4. Remove and replace radio antenna
5. Remove and replace radio
6. Service hood latch/hinge
7. Service and/or replace door hardware
8. Service power window
9. Remove and replace radio speakers
10. Remove and replace tape player
11. Service window washer system
12. Remove and replace mirrors
13. Remove and replace clock

14. Service speedometer head and cable
15. Remove and replace tachometer or dash gauges
16. Remove and replace instrument panel
17. Service wiper assembly
18. Service power seats
19. Service seat belt assemblies
20. Service cigarette lighter
21. Service concealed head lamp assemblies

INSTRUCTIONAL BLOCK Brake System

CONDITIONS	PERFORMANCE	STANDARD
Given a vehicle with a malfunctioning brake system, using acceptable shop methods and tools	The student will diagnose, repair, service and/or replace components in the braking system	All repairs must conform to at least original manufacturer's minimum factory specifications.

MANAGEMENT STRATEGY

1. VARIABLES

Facility:	A storage area for model units, area for bench or dead work for twenty-five students, area for live work providing for a minimum of three vehicles.
Equipment:	A minimum of two combination disc and drum lathes. A separate disc lathe and drum lathe would be ideal. Brake service hand tools as needed.
Students:	Students having difficulty with a module can recycle with other groups until a desired level of competency is achieved.

2. ROTATION
Students will be divided into five groups with a maximum of five students each. Each group will be rotated through five learning modules, each of one week duration, for a total of five weeks. (See attached rotation chart.)

3. LOGISTICAL CONSIDERATIONS
Basic total group demonstrations and orientation will be given to prepare students for entry into the brake modules.
Advanced students as determined by the instructor will begin on the live vehicle, module "E." The instructor must secure chassis components as listed. These can be built by the students and instructor prior to start of this instructional block.
Five drum brake operations models – each with front drum unit, rear drum unit, master cylinder, and brake pedal.
Five models disc brakes – each with a front disc unit.
Two vacuum booster units – bench unit for disassembly and reassembly.
Two chassis lab units – can be cut down automotive chassis consisting of four wheels and all working components of complete brake system. One unit will have disc brakes.

Instructor will plan to secure customer cars, such as used car lot vehicles, junk yard vehicles, staff vehicles, general public and/or student vehicles. This need should be made known far enough in advance to assure sources. The live work in this instructional block will be limited to brake system work duty.

INSTRUCTIONAL STRATEGY

BRAKES - 27 DAYS

Students rotate through five one-week modules of instruction observing a rotation chart. Each student will perform the designated tasks that comprise a particular module of instruction. Safety procedures will be treated as an inherent part of each instructional module.

The instructor will initially give general demonstrations in the following five major areas prior to student participation: drum brakes, disc brakes, master cylinders, lathe operation, and vehicle service.

Demonstrations will follow the general instructions with concentration being devoted to specific items with small group participation. Peer instruction will supplement instructor demonstrations and enhance station to station transition by students.

Machine work will include machining a disc rotor and brake drum within specifications (finish and diameter).

Bench and chassis lab work will include disassembly and reassembly of all brake components.

In all instances, laboratory procedures will be supplemented with related instructions, including necessary mathematics and sciences.

EVALUATION STRATEGY

RELATED AREA

1. Paper–pencil tests
2. Oral questioning
3. Component recognition tests
4. Completion of a schematic of the total brake system

SHOP AREA

1. Task evaluation check-off sheet
2. Module evaluation check-off sheet
3. Student self-evaluation sheet
4. Teacher observation
5. Performance tests
6. Evaluation by instructor of student performance on vehicles
7. Customer evaluation check-off sheet

Modules - Tasks

LEARNING MODULE A.

5 simulated working drum brake models

Remove and replace brake drums
Remove and replace wheel bearings
Remove and replace brake shoes
Remove and replace wheel cylinder
Overhaul wheel cylinder
Remove and replace brake lines
Bleed brake system
Adjust brakes

LEARNING MODULE B.

5 simulated working disc brake models and power brake units

Remove and replace brake pad
Overhaul a caliper
Overhaul power brake unit

LEARNING MODULE C.

2 operable job chassis

Remove and replace master cylinder
Overhaul a master cylinder
Remove and replace emergency cable
Repair brake lights
Remove and replace power brake units

LEARNING MODULE D.

2 brake lathes and tool room attendant

Turn and/or grind brake drum
Turn and/or grind brake disc
Attend tool room

LEARNING MODULE E.

Live vehicles - brake service

Diagnose brake system problems
Service brake systems

*Note – Each group consists of five students

ROTATION SCHEDULE

	Day 1 Day 2	Week 1	Week 2	Week 3	Week 4	Week 5
"Module A" Five simulated working drum brake models	General demonstrations on the brake system including: -drum brakes -disc brakes -master cylinder -wheel cylinder -lathe operation	Group 1	Group 5	Group 4	Group 3	Group 2
"Module B" Five simulated working disc brake units		Group 2	Group 1	Group 5	Group 4	Group 3
"Module C" Two operable lab chassis		Group 3	Group 2	Group 1	Group 5	Group 4
"Module D" Two brake lathes and tool room attendent		Group 4	Group 3	Group 2	Group 1	Group 5
"Module E" Live vehicle brake service		Group 5	Group 4	Group 3	Group 2	Group 1

LABORATORY

1. Adjust Brakes
   *adjust brakes

2. Bleed Brakes
   *bleed brakes

3. Remove and Replace Brake Drum
   *Remove and replace brake drum
   *adjust wheel bearing
   *Torque wheel

4. Remove and Replace Wheel Bearing
   *remove and replace brake drum
   *Remove and replace bearing assembly
   *Inspect bearing
   *Adjust wheel bearing

5. Remove and Replace Brake Shoes
   Remove and replace brake drum
   *Remove and replace brake shoes
   Adjust wheel bearings
   Torque wheel

6. Remove and Replace Wheel Cylinder
   Remove and replace brake drum
   Remove and replace brake shoes
   *Remove and replace wheel cylinder
   Adjust wheel bearing
   Torque wheel

*Indicates a new step to be demonstrated and learned.

RELATED

I. ORIENTATION - 2 days
   1. Management
      a. chart
      b. groups
      c. rotation
      d. proficiency
      e. vehicles
      f. vecycle

   2. Instructional Strategy
      a. demonstration techniques
      b. peer demonstrations
      c. models

   3. Evaluation Strategy
      a. tests
      b. grades
      c. check-off sheets
      d. job sheets
      e. progress charts

   4. Safety
      a. customer
      b. vehicle
      c. student

II. BRAKE SYSTEM SCIENCE PRINCIPLES - 3 days
   1. Simple machines for mechanical advantage (levers)
   2. Work input - output (emergency brake)
   3. Effect of heat and cooling (brake fade)
   4. Fluids under pressure (cylinders)
   5. Transfer of heat (lining to drums)
   6. Effect of friction (brake efficiency)
   7. Motion and forces (unusual conditions)

III. BRAKE SYSTEM MATH PRINCIPLES - 2 days
   1. Real numbers
   2. English measure
   3. Metric measure
   4. Measurement instruments
   5. Basic logic and deduction
   6. Computing devices
   7. Reading and interpreting charts, graphs, and table manuals
   8. Flat rate - time - prices
   9. Addition - subtraction - multiplication - division - decimals

7. Overhaul Wheel Cylinder
   Remove and replace brake drum
   Remove and replace brake shoes
   *Overhaul wheel cylinder
   *Hone cylinder
   Adjust wheel bearing
   Torque wheel

8. Remove and Replace Brake Line
   *Remove and replace brake line
   Bleed brakes

9. Remove and Replace Brake Pads
   *Remove and replace brake pads
   Torque wheel

10. Overhaul Caliper
    *Remove and replace caliper
    *Overhaul caliper
    Pack wheel bearing
    Adjust wheel bearing
    Torque wheel
    Bleed brakes

11. Overhaul Power Brake Unit
    *Overall power brake unit

12. Remove and Replace Master Cylinder
    *Remove and replace master cylinder
    Bleed brakes

IV. DRUM BRAKES - 4 days
1. Brake shoes
   a. steel shoe lining
   b. revited or bonded
   c. pressure to drum (1000 lbs.)
   d. 500 degrees F

2. Backing plate, bendix
   a. platform, shoe webs
   b. hold down, anchor
   c. wheel cylinder adjustor
   d. spring

3. Drums
   a. cast iron liner
   b. cooling material (ribs)
   c. wheel cut outs (size)

4. Self Energizing
   a. shoes loose, primary - secondary
   b. primary with drum
   c. secondary, stopped, anchor
   d. wedges
   e. car weight, inertia, wheel cylinder
   f. forword

5. Self Adjusting
   a. self-energizing
   b. opposite in reverse
   c. cable, pivot, lever
   d. during return, adjusting screw
   e. 15 degrees, .0065 inch, shoes space
   f. in reverse if needed
   g. constant clearance, pedal height

V. DISC BRAKES - 2 days
1. Why disc brakes?
   a. heavy vehicle
      big engine
      automatic transmission
      "left foot" drivers
   b. fade proof
   c. cooling

2. Disc Brakes
   a. rotating disc and pads
   b. cylinders, push pads
   c. less area, no self-energizing

13. Overhaul Master Cylinder
    Remove and replace master cylinder
    *Overhaul master cylinder
    Bleed brakes

14. Remove and Replace Emergency Brake Cable
    Remove and replace brake drum
    Remove and replace brake shoes
    *Remove and replace emergency cable
    Adjust brakes
    *Adjust emergency cable
    Torque wheel

15. Repair Brake Lights
    *Replace brake light switch

16. Remove and Replace Power Brake Unit
    Remove and replace power brake unit

17. Turn and Grind Brake Drum
    *Remove and replace brake drum
    *Turn and grind brake drum

18. Turn and Grind Disc
    Remove and replace caliper
    *Turn and Grind Disc

19. Diagnose Brake System Problems

   d. big piston (3 inch)
   e. fluid, movement, leverage

3. Parts
   a. caliper (holds all parts)
   b. pistons, seals
   c. dust boots
   d. lining to pads

4. Operation
   a. hydraulics, pads to rotor or disc
   b. seal returns - self adjusting
   c. .004 movement
   d. residual valve

5. Disc Types
   a. two piston - fixed
   b. four piston - fixed
   c. one piston - floating (caliper slides on pins)

VI. CYLINDERS - 3 days
1. Master Cylinder
   a. nomenclature
   b. operation applied
   c. operation fast release
   d. residual pressure
   e. compensation and vent

2. Wheel Cylinders
   a. nomenclature
   b. size of pistons to master cylinder

3. Dual Master Cylinders
   a. one cylinder - two pistons
   b. sealing
   c. residual valves
   d. safety factors

VII. SWITCHES AND VALVES - 2 days
1. Step light switch
   a. electrical switch
   b. mechanical or hydraulic
   c. dual switches
2. Brake warning Light Switch
   a. light on dash
   b. shuttle valve operation switch
   c. hydraulic failure

3. Metering Valve
    a. wear on pads
    b. no return in disc
    c. no pressure until 100 p.s.i.

4. Proportioning Valve
    a. prevents rear lockup
    b. over pressure - 500 p.s.i.
    c. cuts to 2/3

5. Combined
    a. one - two - three
    b. depends on equipment

6. Service
    a. centering warning switch
    b. self centering
    c. metering valve, bump in pedal
    d. metering valve - bleeding
    e. proportioning - rear lockup

VIII. PARKING BRAKES - 1 day
1. Nomenclature
    a. cable
    b. rear brake parts
    c. foot pedal - hand lever

2. Types of systems
    a. driveline style
    b. rear drum style
    c. vacuum release

3. Operation
    a. how
    b. why
    c. advantages of different styles

4. Service
    a. lubrication
    b. diagnoses
    c. replacement procedures
    d. adjustment procedures

IX. POWER BRAKES - 1 day
1. Nomenclature
    a. power units
    b. supporting units
        hoses
        valves
        vacuum tanks

2. Types
   a. diaphragm
   b. piston

3. Science Applied
   a. vacuum
   b. atmosphere pressure
   c. force multiplication

4. Theory of Application
   a. how it works
   b. why use vacuum/atmosphere pressure
   c. effects on other braking system components

5. Services
   a. diagnose
   b. replacement or repair

X. BRAKE LINES - 1 day
   1. Types of lines
      a. neopume
      b. steel
      c. no copper

   2. Fittings
      a. swivel
      b. threaded
      c. brass/steel/aluminum
      d. types and styles

   3. Flares - Styles
      a. single
      b. double
      c. special tools

   4. Service
      a. rusted lines
      b. frozen fittings
      c. rounded fittings
      d. diagnose
      e. bleeding procedures (review)

XI. BRAKE SERVICE - 3 days
   1. Customer Complaints
      a. pulls to one side
      b. no brakes
      c. low brakes
      d. noises

- e. drage
- f. chatters
- g. pulsating
- h. excessive effort
- i. no emergency brake

2. General Diagnosis Procedures
    - a. how
    - b. why
    - c. when
    - d. where

XII. SAFETY - 2 days

1. Customer
    - a. quality of workmanship
    - b. quality parts
    - c. proper operation
    - d. away from work area

2. Vehicle
    - a. quality of workmanship
    - b. quality parts
    - c. proper operation
    - d. regular maintenance
    - e. proper jacks and stand placement
    - f. protection from accidental damage
    - g. fire equipment

3. Student - Mechanic
    - a. proper tools
    - b. proper equipment
    - c. clean work area
    - d. proper work habits
    - e. use of safety equipment and devices
    - f. dress

XIII. CUSTOMER RELATIONS - 1 day

1. Professionalism
2. Loyalty
3. Cooperative Venture
4. Dependability
5. Image
6. Leadership
7. Work Ethics
8. Estimating
9. Road Tests
10. Selling
11. Labor and parts
12. Pricing

EDUCATIONAL PROFESSIONAL DEVELOPMENT

Part F, Vocational Education

BUDGET and EXPENDITURE REPORT

STATE OHIO GRANT NUMBER OEG-5-74-0144

SUB-PROJECT IDENTIFICATION:

Number 74082 DATES: From July 1, , 19 74

To August 31, , 19 75

Title Instructional System Design

Agency/Institution The Ohio State University - Instructional Materials Laboratory

Project Director Mr. Tom L. Hindes

Line Item	Description of Costs (OE Form 7203)	Approved Budget		Expenditures		Office Use
1	Director					
2	Secretarial / Clerical	6,000	00	5,860	00	
3	Other Administrative Supporting Staff					
4	Full-Time Instructors					
5	Part-Time Instructors					
6	Laboratory Assistants					
7	Instructional Assistants					
8	Lecturers and/or Consultants	21,000	00	13,115	00	
10	Employee Services & Benefits	3,750	00	1,620	40	
11	Travel	1,900	00	-0-		
12	Office Supplies, Duplicating, Publicity, Communications	1,000	00	1,000	00	
13	Instructional Supplies, Etc.	2,225	00	1,308	30	
14	Required Fees					
15	Equipment Rental					
18	Participants	4,525	00	4,373	00	
19	Dependents					
22	Indirect Costs	3,232	00	2,182	14	
23	GRAND TOTALS FOR SUB-PROJECT	43,632	00	29,458	84	

Prepared by: Date

13. Completion of Work
14. The Invoice
15. The Guarantee
16. Complaints
17. Compliments
18. Making Change
19. Arrangements for Credit
20. Personal Hygiene
21. The Customer
22. Individual Differences